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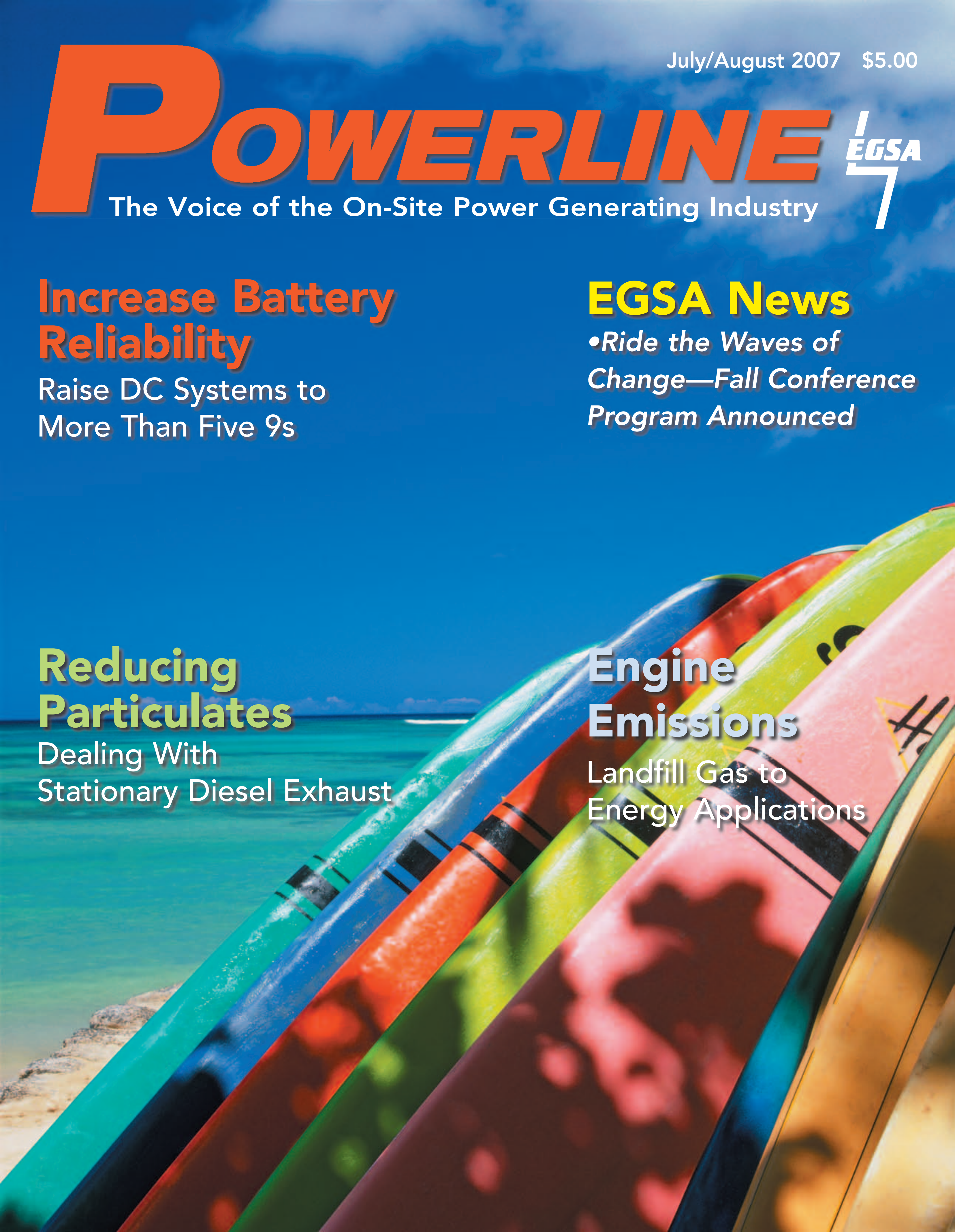

Increase Battery Reliability

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EGSA News

•Ride the Waves of Change—Fall Conference Program Announced

Reducing Particulates

Dealing With Stationary Diesel Exhaust

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EVENTS CALENDAR

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September 16-18, 2007; Maui, HI
Speakers will cover business and technical aspects of On-Site Power Generation and current industry trends. For information, visit *www.EGSA.org* or call (561) 750-5575.

EGSA 2008 Annual Spring Convention

March 16-18, 2008; Santa Ana Pueblo, NM

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POWER-GEN Asia 2007

September 4-6, 2007; Bangkok, Thailand
Recently combined with China Power, this event is one of Asia's biggest power generation shows. For information, visit *www.powergenasia.com.*

Vietnam Electricity Expo 2007

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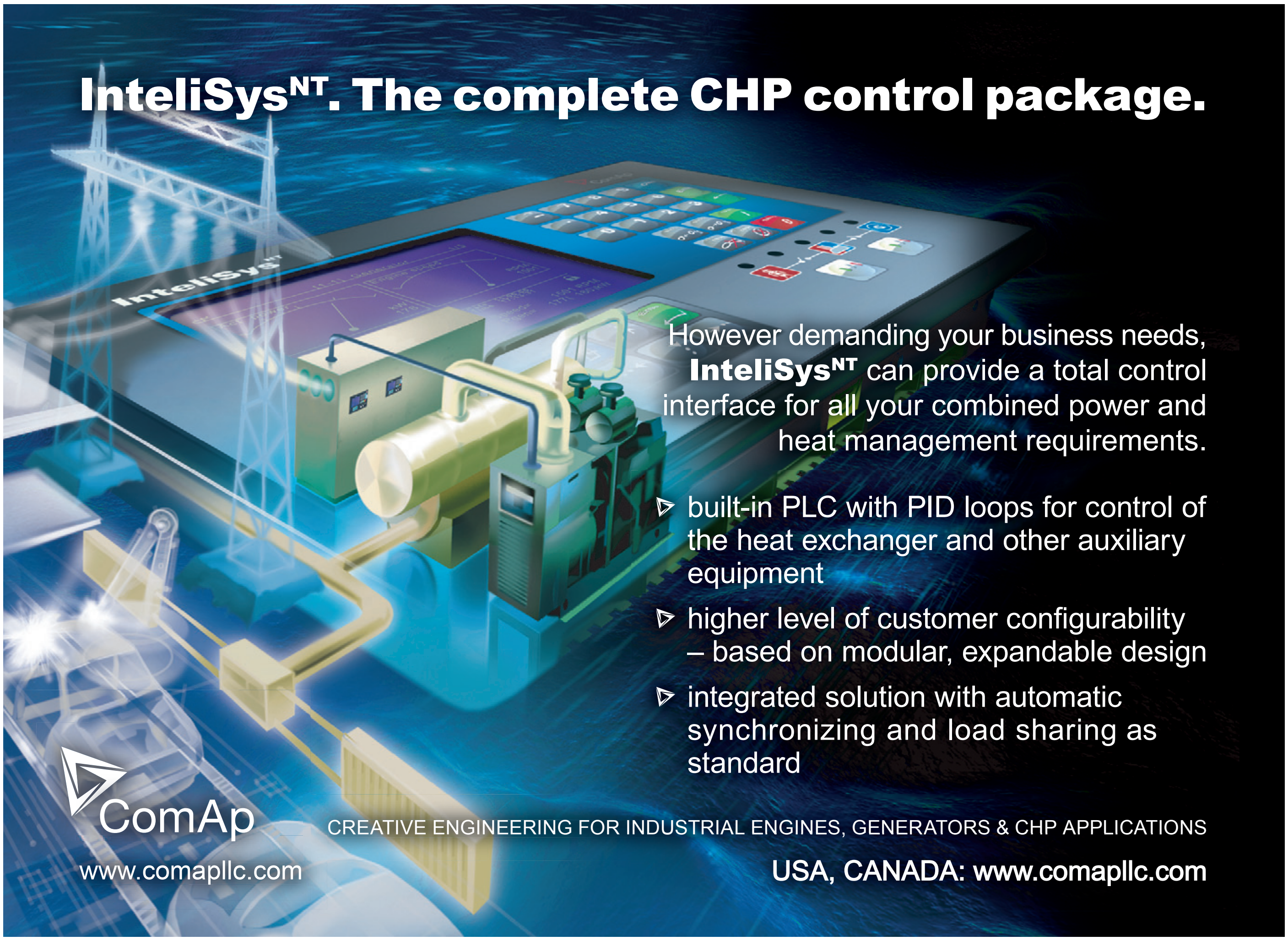
EGSA Members: List your meetings here; fax your information to (561) 395-8557.

Look for more industry events in our up-to-date calendar on the web at *www.EGSA.org*



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Gary Kidwell
2007 EGSA President

NFPA Article 585: A Sign of the Times

National Fire Protection Association (NFPA) Article 585 is a sign of the times. Natural disasters, terrorist attacks, even human failure, make the times we live in challenging, and Article 585, "Critical Operations Power Systems," rises to the challenge.

Borne primarily of the demands for homeland security, the article is far reaching. It covers the installation, operation, and maintenance of power systems and circuits critical to national security, the economy and public health and safety.

It recognizes the roles of a variety of building types, protection schemes, and the value of risk assessment. While securing business-critical power systems against attack, it also seeks to ensure they operate reliably during and after hurricanes and other natural disasters.

Municipal, state, federal and local authorities having jurisdiction determine whether an on-site power system is business critical. Types of facilities that could require business-critical power systems guided by Article 585 are hospitals, 911 call centers, police, telecommunications centers, and even financial and data centers.

The article's intention is to help ensure that on-site power systems for these types of facilities can operate longer and be protected from the disasters themselves. The article, for example, requires that business-critical power systems be able to operate at least 72 hours at full load.

The reason is that extended power outages, especially when a disaster strands people in buildings such as what happened in the aftermath of Hurricane Katrina in New Orleans, demands more of on-site power systems.

Consider the article more evolutionary than start-from-scratch code making. Code-Making Panel 20, created by the Technical Correlating Committee Task Group on Emergency and Standby Power Systems for Homeland Security, crafted an article that builds on an already solid base of standards and guidelines. Article 700, for example, contributed its requirements for electrical infrastructures.

The heart of Article 585 is Section 585.4. It describes guidelines for assessing risk for business-critical power system operations. Assessments include natural and man-made threats, the likelihood of them happening, and how they might affect on-site power systems. Any issues identified by the assessment would need to be mitigated.

The article comprises five parts. The first, patterned in part after Article 700.4, includes testing and maintenance, definitions and pays particular attention to assessing risks and easing their potential threat.

Interesting examples include protecting business-critical power systems from cyber and physical attacks, and relocating or retrofitting power systems that are susceptible to a threat (i.e., flooding due to hurricanes). Another example is considering having redundant systems, operations and information, and even personnel.

The second part specifies that circuit wiring and equipment installed below the 100-year flood plain be listed for use in a wet location.

Power and connection sources are covered in part three and part four specifies that only authorized personnel have access to overcurrent protection devices for the feeder and branch circuits.

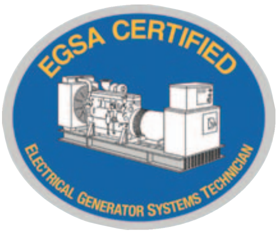
The last part focuses on system performance and analysis. It requires a documented emergency facilities plan that addresses emergency operations, recovery and business-critical continuity.

In development since 2005, the article is ready for a full vote by NFPA in July. As you read this, the article may well be going to press as part of the 2008 NEC update.

For manufacturers, Article 585 means our customers will be paying much more attention to business-critical power systems. We may need to participate in risk assessments, and designing systems that comply with the article will be more involved.

As we all know, change is part of business and as Article 585 shows, it's a sign of the times as well.

George Rowley
EGSA Director
of Education



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Certified Technician Logo Items Are Now Available–In addition to our uniform patch, Certified Techs can now order baseball caps and decals adorned with the EGSA Certified Technician logo. The logo items proclaim that the wearer is an "EGSA Certified Electrical Generator Systems Technician."

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An order form can be found in this issue of *Powerline* and on our web site (*www.EGSA.org*).

Technician Certification Program Update

Interest in the Technician Certification program is strong and increasing – we have responded to many inquiries about this important program from techs and their employers from across the United States and from Canada, Mexico, the Caribbean, Central and South America and from Asia and the Pacific Rim.

As of May 31, 71 technicians in 26 States have earned the right to use the title "EGSA Certified Electrical Generating Systems Technician." More significant is the 280 techs that have purchased the certification test Study Guide and are preparing to take the test. Passing the certification test is a true measure of a tech's knowledge, skill, and proficiency. Employing Certified Technicians adds credibility to the employers' commitments to high standards and proficiency, and to meeting the needs and expectations of customers.

Virginia Leads! Here is a list of how many Certified Techs there are in the States listed. **Ten Certified Techs**: Virginia; **Seven Techs**: Georgia, Ohio; **Five Techs**: Florida, Arizona; **Four Techs**: Texas; **Three Techs**: Massachusetts, New York, Pennsylvania; **Two Techs**: California, Colorado, Idaho, Indiana, Maryland, Michigan, North Carolina; **One Tech**: Alaska, Iowa, Kentucky, Louisiana, New Jersey, South Carolina, Tennessee, Utah, Wisconsin, West Virginia.

Are you or your techs preparing to take the test and earn the right to wear the patch? Find extensive information about this important program on our web site. Watch for details coming soon on pricing for a 'bundled' reference book/study guide package.

If you have questions or need additional information about the Certification Program or any of EGSA's education programs contact George Rowley by e-mail at *G.Rowley@EGSA.org*. ■

Techs Stand Apart from the Competition with the EGSA Certified Electrical Generator Systems Technician logo

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☐ FSU 124	☐ FSU 125		**Self-Adhesive Decal** (8"x10")	☐ $20	☐ $25	

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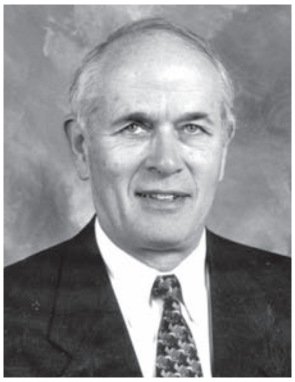

Herb Whittall
EGSA Technical Advisor

Today's Hot Topic: Electrical Safety

CIMAC—the International Council on Combustion Engines—has 10 active working groups that are similar to those for the IEC (International Electrotechnical Commission) and ISO (International Standards Organization). They work to formulate class rules and requirements for engine builders and users and for international regulatory agencies. In the U.S., we have (SAE) Society of Automotive Engineers acting as the U.S. representative for the ISO working groups on engines. The American National Standards Institute (ANSI) is the representative for many other ISO working groups and votes for the U.S. on the acceptance and passage of ISO standards. But there is no group that I know of for small engines and generator sets set up like CIMAC. They have working groups on exhaust emissions, fuels, lubricants, turbocharger efficiency, engine users, electronics and software systems, among others.

In my last Standards column, I mentioned a compromise in the wording of the paragraphs on Selective Coordination. It turns out that the final vote on Comment 13-135 was approved 11-2 by ballot so it will be included in the 2008 edition of the National Electric Code. An exception was added to article 700.27 which will read :

"Exception: Selective coordination shall not be required in (1) or (2).

(1)Between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exist(s) on the transformer secondary.

(2)Between overcurrent protective devices of the same size (ampere rating) in series."

The hottest topic for Panel 13 of the National Electric Code was coordination of tripping circuits. The core of the discussion was "arc-flash" danger and whether fuses or circuit breakers were better to lower the chance of an arc-flash. Obviously, the danger of arc-flashe has become a big topic. The May/June issue of *IEEE Industry Applications* magazine focused on "Being Safe in the Workplace." Looking at these articles, I am sure that the next round of proposals for the National Electric Code and NFPA 110 will still have many relating to selective coordination and arc-flash hazard.

The April 2007 *NEC Digest* also had an article on electrical safety. During the Spring EGSA Conference, the Dealer/Distributors were interested in *NFPA 70 E – Standard for Electrical safety in the Workplace*. The standard covers a number of safety issues—from putting equipment in an electrically safe work condition to personal protective equipment requirements. Obviously, knowing NFPA 70E is a must for those working around live electrical circuits.

NEMA has published an American National Standard for Safety Colors. If any of you are interested in this standard you can download it at *www.nema.org*.

In the 2008 edition of the National Electric Code, NFPA70, there will be a new article 708 titled "*Critical Operations Power Systems*." This article, put together by panel 20, "comes from a call by the Department of Homeland Security for a meaningful advance in the capability of critical infrastructure to continue providing necessary services in the wake of catastrophes…" per the April *NEC Digest*.

UL has issued the first edition of its Standard *UL 2201 Portable Engine-Generator Assemblies* and is dated May 11, 2007. It shows the decal required for safety reasons. This decal is in English only in the standard, but there was a lot of discussion in the writing stages that it needed to be symbolic so that non-English speakers would understand the danger of Carbon Monoxide Poisoning. The same decal must be attached to all sides of the packaging. The danger of carbon monoxide poisoning is very real from these small generator sets. They have no long length of exhaust pipe where the carbon monoxide can change into carbon dioxide, so as one researcher from the Consumer Product Safety Department found out, a small generator puts out 10 times as much carbon monoxide as her automobile. Carbon monoxide gets absorbed by the blood and will quickly kill you. Carbon dioxide will suffocate you if you are in an atmosphere with too great a concentration.

Finally, NFPA is looking for volunteers like most organizations these days. However, this is the first time I have seen a request for members to apply for a Technical Correlating Committee for *Health Care Facilities* (NFPA 99) in all categories. NFPA is also looking for members in all interest categories for NFPA 99 *Health Care Facilities* for Electrical Systems (which Herb Daugherty and I are on). A third item of interest to EGSA members is the NFPA Committee on Internal Combustion Engines, however, here NFPA is only looking for interest categories of enforcer and user. This is for NFPA 37 *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*. ■

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Educational Sessions, Program for 2007 EGSA Fall Conference Announced

BOCA RATON, FL — The Electrical Generating Systems Association (EGSA) has announced it will hold its 2007 Fall Technical & Marketing Conference September 16-18 at the Grand Wailea Resort Hotel & Spa in Maui, HI. Conference speakers and their topics have been designed to be of interest to virtually every member of the On-Site Power Industry. The following educational presentations will be featured in the program.

Opening Keynote: Yield to New Ideas

James B. Lloyd, President & Owner, 9 Screens International

This presentation will discuss methods for employees and employers to find the positives with change. Whether it is a corporate merger, corporate restructuring, or downsizing; finding the positives in change will create an environment of growth and loyalty.

For the past 25 years, James Lloyd has captivated and inspired audiences on five different continents. He magically engages listeners with his genuine down-home approach: a unique blend of timely humor, insightful knowledge, contagious enthusiasm, and personal sharing. James plucks his poignant stories from a background rich in training, leadership development, sales, customer service, and, as he puts it, just "good ol' living." While memorably weaving this all together, James displays a remarkable gift to touch people's hearts.

James background includes eleven years as a missionary, several years as a professional trainer, and eight years as a corporate trainer and motivational speaker for Wellpoint, the largest health care benefits company in America. He ventured out and began his own company, 9 Screens International in 2002.

NFPA 70E Electrical Safety Requirements in the Workplace

Speaker TBD

This session will provide an overview of the compliance requirements to meet NFPA 70E including both protective equipment required and employee training.

Luncheon Keynote: The Cookie Never Crumbles

Wally Amos, Chip & Cookie

Wally Amos is a man of wisdom, a man of humor, and a man of joy. And he has learned the greatest secret in life: You can be happy no matter what. Wally will share his inspiring collection of "recipes," and tell you how adversarial situations are often blessings in disguise, and how the lessons we learn in life sometimes come from the most unexpected places. The Cookie Never Crumbles is Wally's philosophy, and during his lecture he will tell you, through touching, hilarious, thought provoking stories, how you can adopt this philosophy for yourself. From Wally's childhood, up through his days in the entertainment business, to the creation and loss of "Famous Amos" cookies, and to his current way of life, Wally Amos struggled, adapted, and finally triumphed. His inspirational advice will make you laugh, make you dream and make you think. This is a message built on faith!

Wally's most recent venture is, Chip & Cookie, a retail store, on Oahu, in Kailua Town, Hawaii and an e-Commerce business, featuring five flavors of cookies and two chocolate chip cookie plush character dolls, Chip & Cookie, created by Christine Harris-Amos. Wally & Christine founded the Chip & Cookie Read Aloud Foundation in 2005 urging parents and caregivers to read aloud to children for at least 10 minutes each day. Ten percent of the net profits realized by Chip & Cookie LLC will benefit the foundation.

In 1994 he co-founded the Uncle Wally's Muffin Company which produces a full line of muffins. As founder of Famous Amos Cookies in 1975 and father of the gourmet chocolate chip cookie industry, he has used his fame to support educational causes. Wally was National Spokesman for Literacy Volunteers of America from 1979 until 2002 when they merged with Laubach Literacy Council to create ProLiteracy Worldwide. He now refers to himself as a Literacy Advocate. He serves as a Board Member of the National Center for Family Literacy and Communities in Schools. In addition, he serves as Chairman of the Chip & Cookie Read Aloud Foundation.

Wally Amos has been the recipient of many honors and awards. He gave the shirt off his back and his battered Panama hat to the Smithsonian Institution's Business Americana Collection. He has been inducted into the Babson College Academy of Distinguished Entrepreneurs, and he received the Horatio Alger Award, The President's Award for Entrepreneurial Excellence, and The National Literacy Honors Award. Wally is also an author who has written eight books including his autobiography, *The Famous Amos Story: The Face That Launched A Thousand Chips.*

Asia's Impact on North American Manufacturers

Stephen LeGrand, Director of Operations - Worldwide, Kohler Power Systems

Asia manufacturing continues to grow at an extraordinary rate compared to other regions of the world. Its workers are acquiring skills that will shortly parallel those of western countries. Asia's products and services continue to increase in complexity and quality while maintaining lucrative cost positions. This area of the world is on the move and the power generation market is a major area for growth.

Stephen LeGrand is the Director of Operations, Worldwide for Kohler Power Systems. Stephen leads a growing global operations team in Singapore, China, India and the US. Before joining Kohler Power Systems, Stephen worked for NewellRubbermaid, Rockwell International and Hughes Aircraft Company (a division of General Motors) where he held positions in engineering, production, materials and quality. Stephen holds a Bachelor of Science degree from the University of Northern Iowa, an MBA from the University of Iowa, certification in Integrated Supply Chain Management from the University of Tennessee, CPIM certification from the American Production & Inventory Control Society and a certification in Technology from the Society of Manufacturing Engineering.

Continued on page 14

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Continued from page 12

The State of the On-Site Power Market

Ray Kacvinsky, Vice President - Power Generation, Marathon Electric Mfg. Corp.

This presentation will review EGSA generator statistics from 2000 through the first part of 2006. EGSA market data will be compared against other industry information using an economic early warning technique with the data to develop a near-future On-Site Power market outlook.

Ray Kacvinsky is Vice-President of Power Generation at Marathon Electric, a division of Regal-Beloit and Past President of EGSA. At Marathon he has been Vice President of Sales and Marketing for motors and generators, marketing manager, product manager and in corporate planning. Previously a management consultant, Ray has obtained his certification in energy management.

Current Health of the Large Engine Industry–2007 Statistics

Mark McNeely, Publisher and Editor, Diesel and Gas Turbine Publications

For the past 30 years, Diesel & Gas Turbine Worldwide has published its annual Power Generation Order Survey, which encompasses all piston and gas turbine engine orders for power generation applications 500 kilowatts and above. This presentation will analyze this year's survey figures, including which engine ranges saw increased orders, or decreased in volume. It will also break out various engine order trends by type of fuel, type of service and geographic location.

Mark McNeely is Publisher & Editor of Diesel & Gas Turbine Worldwide magazine, a technical trade journal specializing in communicating the latest product, technology and industry news for the internal combustion engine industry, which includes large reciprocating and gas turbine engines for marine and stationary power applications. Mark holds a master's degree in journalism from the University of Wisconsin. He is also Chairman of the Communications and Conventions Committee.

Data Centers....uh oh...Here Come the High Nines Again!

Don Blackman, V.P. Marketing & Domestic Sales, ASCO / Power Switching & Controls

This session will review the growing demand for Data Storage and what's driving it. Data Center Facility expansion and new construction are expected to grow significantly in the next four to six years. Data Centers can range in size from very small Tier-I types all the way up to huge buildings in a Tier-IV configuration. The greater the uptime expectation, the more backup power and control is required.

Don is Vice President, Marketing & Domestic Sales for ASCO (ASCO Power Technologies L.P.) He has been with ASCO since 1977 (30 years) and his experience includes positions in product / application support, sales support, field sales, sales management, product management, marketing and strategic business development. In his current position he is focused on developing business initiatives on the behalf of ASCO, and its parent company, Emerson Electric, in the Mission Critical / Health Care, Data Center, and Telecom markets. His responsibilities also include worldwide equipment and solutions product management and marketing to support these Industry initiatives. His efforts include organizing and coordinating with the resources of Emerson's Network Power businesses and bringing to market power solutions that meet the needs of the energy market. He is a member of IEEE and is actively involved in industry organizations concerned with the safety and reliability of power control, transfer, and switching systems.

Don received his BSEE / Power Systems degree from New Jersey Institute of Technology and an MBA / Marketing from California State University.

Residential Standby Power: The Future of On-Site Power in the Home

Todd Lathrop, Senior Design Engineer, Eaton Corp.

The demand for electricity in the residential sector continues to increase as more power-hungry devices are being added to the home environment. As the power grid continues to become more decayed and overloaded and the frequency of storm-related power outages continue to increase, the reliability of electrical power to the home becomes less. For these reasons pad-mounted standby generators are quickly becoming the air-conditioners of yesteryear. This presentation focuses on the state of the residential generator business and where it is going.

Todd Lathrop is a Senior Design Engineer for the Eaton Corporation's Residential Products Division. His current responsibilities include design of and application support for residential transfer switch and engineering, marketing, and application support for residential standby and portable generators. He has 11 years experience in design and application of power switching equipment with an emphasis on Automatic Transfer Switches.

Todd received his bachelor's degree in Electrical Engineering from The University of Pittsburgh and is one of EGSA's On-Site Power School instructors.

EGSA Manufacturers Forum

In addition to the lineup of educational sessions, the conference will include EGSA's highly successful Manufacturers Forum. The exhibition setting allows for a more formal dialogue between EGSA-member manufacturers, attending Distributor/Dealers and manufacturer representatives. Exhibiting companies are provided with a draped six-foot table which can be used to display literature, magazines and samples, etc. For complete conference information—including session descriptions and speaker biographies—or to register for the conference, please visit EGSA online at *www.EGSA.org*. ■

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Emissions from Engines in Landfill Gas to Energy Applications

By Dave Heitz, P.E., Geosyntec Consultants

Engines are used in a wide variety of applications ranging from mobile uses (automobiles) to electric power generation. A complex set of air regulations govern allowable emissions from these sources. Even narrowing the discussion to engines used for electric power generation, the rules, regulations and acronyms are complex. This article narrows the discussion further, to focus on the specific application of landfill gas fired, internal combustion (IC) engines used to generate electricity. A general overview will be followed by a specific example and a look at trends in the industry.

Regulated Pollutants

When discussing emission standards for any source under the Clean Air Act (CAA), there are two basic categories of pollutants: criteria pollutants and hazardous air pollutants. The primary criteria pollutants are:

- Nitrogen oxides (NO_x);
- Volatile Organic Compounds (VOCs);
- Carbon Monoxide (CO);
- Particulate Matter (PM); and
- Sulfur Oxides (SO_x).

NO_x is a pollutant of concern for any combustion source as it and VOCs are precursors to the formation of ozone. NO_x and VOC in the presence of heat are known to react to form ground level ozone, which is a growing concern in the US. Since NO_x is generated in larger quantities than VOCs and many areas are NO_x limited, NO_x emissions are examined closely by regulators.

Based on emission levels, CO is another pollutant often considered a concern for combustion sources. It is also interesting in that NO_x and CO are inversely related in the combustion process. As effort is made to reduce NO_x, CO emissions tend to increase and when effort is made to reduce CO emissions, NO_x emissions increase. Due to the interdependence, some regulators will request an optimization of the two pollutants be achieved through source testing.

PM and SO_x are not normally as much of a concern in landfill gas to energy (LFGTE) applications. Due to the nature of landfill gas and the pretreatment normally associated with LFGTE projects, landfill gas-fired engines are clean burning with low amounts of PM. In a typical municipal solid waste (MSW) landfill, SO_x emissions are not a concern. However, some landfills take in larger amounts of sulfur containing waste that can cause air permitting issues. In these situations, pretreatment for removal of the sulfur in the landfill gas is required.

The second category of pollutants regulated under the CAA is hazardous air pollutants (HAPs). The United States Environmental Protection Agency (EPA) established the chemical compounds or family of compounds in this category in the CAA amendments of 1990. Of the 188 HAPs, some commonly found in LFGTE facilities include vinyl chloride, mercury compounds, formaldehyde, and hydrogen chloride. HAP emissions are not normally as much of a concern, although the family of pollutants may become more of a factor in states that have air toxics programs.

Potential LFGTE Emission Standards

Potential emission standards for engines at LFGTE facilities can come from many sources including: 1. Source category standards such as the Landfill New Source Performance Standards (NSPS) or the landfill Maximum Achievable Control Technology (MACT) standards, 2. State or local standards, 3. New Source Review (NSR) requirements, and 4. Green or renewable energy requirements. Each one of these is discussed below for the general LFGTE project. Then the same categories are applied to a specific LFGTE project that was permitted in 2006 in Atlanta, Georgia.

Landfill NSPS or the landfill MACT standards: NSPS and MACT standards are a group of standards that apply to specific sources such as MSW landfills. NSPS regulate criteria pollutants and the MACT standards regulate HAPs. In the case of MSW landfills, the NSPS requirements were first promulgated (under 40 CFR 60, Subpart WWW) and then the MACT was established (under 40 CFR 63, Subpart AAAA). The NSPS did not set a specific emission standard, but required all collected landfill gas to either be controlled by an open flare, controlled by an enclosed combustor (such as an enclosed flare or IC engine), or treated for beneficial use such as for a LFGTE. The only limit on emissions under the NSPS is the requirement to reduce Non Methane Organic Compounds emissions by 98 percent (or 20 ppm as hexane at three percent oxygen). No additional control requirements were added with the landfill MACT. When EPA promulgated the landfill MACT, no additional control requirements were added.

State or local standards: In addition to any limits imposed by federal rules, states may establish more stringent emission standards. As they see fit, local regulators may establish standards for specific industries, sources, or for sites in areas with poor air quality. These standards will vary by area and source, but an example of this type of limit is in Texas and (California) South Coast LFGTE projects in ozone nonattainment areas which are required to meet a limit of 1.77 pounds of NO_x per megawatt hour.

NSR requirements: NSR is a federal pre-construction air permitting program. The complex regulation is comprised of two separate programs: NSR – Prevention of Significant Deterioration (PSD) for areas that are in compliance with the National Ambient Air Quality Standards (NAAQS) for the specific criteria pollutant and the NSR – non attainment (NA) for areas that have not met the NAAQS for the specific criteria pollutant. NSR applicability is evaluated on a pollutant specific basis since an area may be nonattainment for one pollutant while being in attainment for other pollutants. NSR affects major sources of criteria pollutants including new major sources, modifications to minor sources making them major and major modifications to existing major sources. Applicability is based on potential emissions and if a project is subject to NSR. If a project falls under NSR, there are several levels of emissions limits that will apply and the limits will be based on the sources emissions prior to the project, the increase in emissions from the project, and the attainment status for the specific pollutant in the area of the source. Three levels of control that can be required include:

- Reasonably Available Control Technology (RACT) is required on existing sources in areas that are not meeting national ambient air quality standards (i.e., non-attainment areas);
- Best Available Control Technology (BACT) is required on major new or modified sources in clean areas (i.e., attainment areas); and
- Lowest Achievable Emission Rate (LAER) is required on major new or modified sources in non-attainment areas.

The level of control is technology driven, source specific, and mostly determined on a case-by-case basis. As technology improves for a specific type of source, the level of control will remain the same or decrease over time. In general the level of control required increases from RACT to BACT to LAER. This is due to what is considered in determining the level of control. For example, BACT control can take into account energy, environmental, and economic impacts and other costs where LAER does not exclude any control technology for economic reasons.

Green or Renewable Energy Requirements: Landfill gas is generally accepted as renewable energy source. Renewable energy sources replenish themselves over time and are less damaging to the environment. Electricity generated from renewable energy sources are often referred to as green power and can be sold at a premium. Green power is gaining in popularity, but is still relatively new. Since green power is less damaging to the environment, there may be emission limits from either a certifying agency or the local utility company marketing the electricity.

Table 1: New Source Review Applicability Summary

Pollutant	Change in Emissions	PSD Significant Increase Threshold	Is PSD NSR Permit Required?	NA Significant Increase Threshold	Is NA NSR Permit Required?
NOx	23.9	N/A	N/A	25	No
VOC	21.7	N/A	N/A	25	No
CO	191.1	250	No	N/A	N/A
PM	32.1	250	No	N/A	N/A
SOx	23.4	250	No	N/A	N/A

LFGTE Emission Standards Example

To illustrate the application of the above referenced potential drivers of LFGTE projects, they will be applied to an actual project that went through the air permitting process in 2006 in one of the counties in the Atlanta, Georgia, ozone non-attainment area. The landfill had an existing gas collection and control system that used an open flare. The project involved adding two IC engines with a total capacity of 3.2 kW.

Landfill NSPS or the landfill MACT standards: The landfill was subject to the full requirements of both the landfill NSPS and MACT, but there were no emission limits from either standard. Instead of having the engines considered a control device subject to the 98 percent control of non-methane organic compounds (NMOCs), the project used the treatment system for beneficial use option for compliance.

State or local standards: Because the engines were not being considered as a control device to meet an applicable standard and they would be emitting NO$_x$ emissions in the ozone nonattainment area, they were potentially subject to the NO$_x$ RACT rule under the Georgia air rules. NO$_x$ RACT is established for this project by Georgia Rule (mmm). Rule (mmm) establishes a NO$_x$ limit for stationary engines installed after April 1, 2000, used to generate electricity of 80 ppm NO$_x$ @ 15% oxygen on a dry basis. This RACT level of control ultimately did not apply because a more restrictive limit was required.

NSR requirements: Because of deadlines established in the PPA, the LFGTE permitting process was on a tight timeline that would not be met if the project would have to go through either PSD or NA NSR permitting. The landfill was already a major source of NO$_x$ under NSR NA, and a minor source for all other pollutants. Therefore, the primary pollutant of concern was NO$_x$. The air permit application was written to take a federally enforceable limit of 0.5 grams of NO$_x$ per horsepower-hour on NO$_x$ to keep the increased emissions less than 25 tons per year. The summary of project emissions is shown in Table 1 above.

Green or Renewable Energy Requirements: Electricity from the project was going to be sold as green power in the Georgia Green Power program. In most

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situations where electricity is sold at a premium due to it being generated from a renewable energy source, there will be an accreditation agency and process to verify that the energy did come from an approved renewable energy source. The power from this project was to be subject to the Green-e Accreditation program requirements. When the air permit application for the LFGTE facility was submitted, the final Green-e standards for Georgia had not yet been established. The existing standards were the December 15, 2003, draft standards, which contained a NO_x emission limit equivalent to 0.5 gram of NO_x per horsepower-hour for all biomass fuels used in the nonattainment area. It is interesting to note that the final Green-e standards for Georgia did not include this NOx limit for biomass fuels, but since this was equal to the limit necessary to avoid NSR NA permitting, this limit was already going to be a federally enforceable limit of the permit.

To help promote the positive benefits of the project and the favorable emissions from this green power project, emissions of NO_x, SO_x, and mercury for LFGTE facilities were compared to other power generating sources. The four categories compared were: 1. A weighted average for all LFGTE technologies; 2. The Georgia e-grid average for all (emitting and non-emitting) sources; 3. The national e-grid average for emitting sources (excludes non-emitting sources such as nuclear and hydro); and 4. The national e-grid average for all sources (including non-emitting sources such as nuclear and hydro). The comparison is shown below in Figures 1 through 3.

Means of showing compliance. For projects taking federally enforceable limits close to the threshold that would require NSR permitting and that have no monitoring or testing required by an underlying regulation, agencies will normally require some means of showing the requested limit is being maintained. A search of EPA's RACT/BACT/LAER clearinghouse was made for engines with NO_x limits used in LFGTE applications. The search identified both a range of NO_x limits, type of control required, and testing/monitoring that was required. The search came up with 23 LFGTE projects that were either landfill gas-fired or cogeneration (with diesel) applications. The sites covered ten states and six EPA regions.

Figure 1: LFGTE Emission Reduction Benefits for NOx (lbs. per MWh)

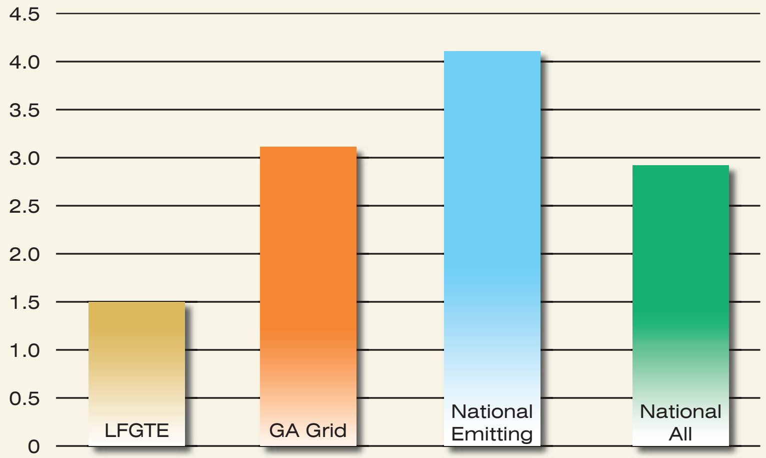


Figure 2: LFGTE Emission Reduction Benefits for SOx (lbs. per MWh)

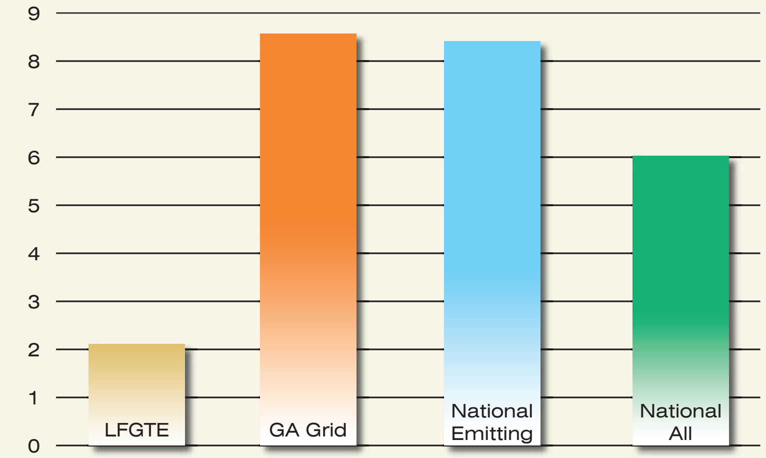
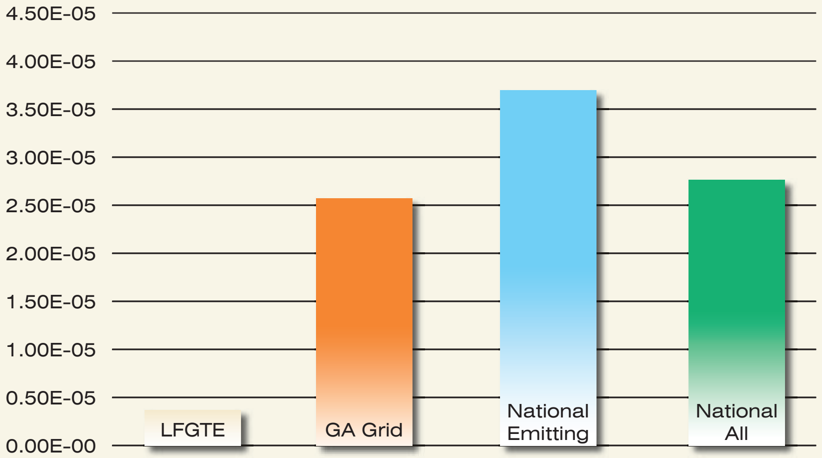


Figure 3: LFGTE Emission Reduction Benefits for Mercury (lbs. per MWh)



The NO_x emission limits ranged from a low of 0.5 grams per horsepower-hour to a maximum of 5.7, with the median being 0.6. None of the determinations specified add-on controls as technology needed to meet the level of control. The most common control technologies noted were: air to fuel ratio controller, lean burn technology, spark ignition, and turbocharge technology.

There was also a wide variation in the method of showing compliance. The most rigorous requirement is in California of requiring continuous NO_x emission monitoring, which is required of virtually all applications similar to LFGTE. Methods used for sources in other states included performance testing with follow-up monitoring or the use of portable NO_x analyzers. In the Georgia example, parametric monitoring of engine manifold temperature, manifold pressure, air to fuel ratio, and engine load was set up as the compliance method, mainly because that has been incorporated into other LFGTE permits in the state. An initial performance test was required at which time the ranges for the four parameters were established. This parametric monitoring was put in place for determining ongoing compliance with the NO_x emission limit and was not established to show compliance with the landfill NSPS. Since the project used the treatment system option for compliance under the landfill NSPS, there is currently no required monitoring of either the engines or the treatment system at this time. This could change as EPA has proposed monitoring for treatment systems to include continuous monitoring of pressure drop across the filtration system and temperature (or dew point) for the dewatering systems.

Summary of LFGTE Example

The emission requirements discussed for the specific LFGTE project is just one example given as an example of possible triggers for emission limits for engines used for electric generation. Many factors come into play in determining what limits will apply for an application and are beyond the scope of this article. Another factor to consider is that new state and federal regulations are always being promulgated or revised, so it is important to keep current on potential regulations.

For example since the time of the example permitting project referenced in this article, EPA proposed one and finalized a second regulation potentially applicable for engines. EPA proposed an NSPS standard for reciprocating internal compression engines (40 CFR 60, Subpart JJJJ) and promulgated the compression ignition internal combustion engine NSPS (40 CFR 60, Subpart IIII). Additionally, there was a MACT standard for reciprocating internal combustion engines (40 CFR 63, Subpart ZZZZ) that was in effect during the example, but didn't impose any limits. But even this final rule had a proposed amendment that was published since the application for the sample project was submitted. To get into all the potential emission limits and requirements for various classifications of engines is beyond the scope of this article, but emphasizes the importance of evaluating all potential regulatory drivers.

History of Engine Emissions

Over time, emissions from any source type will tend to decrease due to new regulations and/or technology advances and engines at LFGTE facilities are no different. One way of looking at changes in emissions from any type of source is to look at the BACT level of control required at different points in time. A general comparison of BACT control is shown in Table 2.

Table 2: Comparison of BACT for LFGTE

Pollutant	Approximate BACT (g/HP-hr)	
	Early 1990s	Current
NOx	1.5	0.5 - 0.6
CO	2.7	2.1 - 3.0
NMOC	0.58	0.4 - 0.8

Great improvements have been made since the early 1990s in NO_x reduction. In many cases, NO_x is the most scrutinized component of emissions from combustion sources, due in part to the growing interest in reducing NO_x to help reduce ozone problems. Technology has probably gotten NO_x emissions about as low as possible without any add-on control which is evident by the clearinghouse example in this article. At some point, there may be a push to get emissions even lower than the current BACT levels, but this can probably only be accomplished with add-on controls. Post-combustion NO_x reductions can be accomplished through the use of selective catalytic reduction (SCR) on natural gas-fired engine applications. Due to the trace contaminants found in landfill gas, this add-on control option is not effective for reducing

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NOx without extensive pretreatment of the landfill gas and, therefore, is not used. The extra pretreatment required at this point is so costly that it hasn't been required. But, when LFGTE projects start implementing this strategy to lower NO$_x$ below the current levels, the bar will be raised for future projects.

The BACT level of CO emissions has not significantly changed over the last ten to fifteen years, but that may be changing. One complicating factor is the interdependence between NOx and CO. As with NO$_x$, CO emissions probably can't get much below the established level without add-on controls (or adversely effecting NO$_x$ emissions). Potential add-on controls can include oxidizing catalysts or Jenbacher's Cl.AIR process. Jenbacher's process relies on elevating the temperature of the engine exhaust and by providing increased detention time to encourage more complete conversion of CO to Carbon Dioxide (CO$_2$). As with the add-on NOx controls, these have not been required and have some of the same issues, such as how much pretreatment will be required (for oxidizing catalysts) and will the added costs make the project cost prohibitive.

Conclusion

Determining what emission level an engine will have to meet may not be a simple task. Factors that need to be considered include regulatory drivers, the size of a project, the type of application, and the industry where the engine will operate. The requirements of both the emission level required and the method required to show ongoing compliance can get complicated by confusing regulations that seem to always be changing. In general, technology improvements have allowed emissions to be lowered over time to meet new regulatory requirements, but they may continue to be forced lower. Whenever looking at an application of engines, the air permitting requirements and delays need to be factored into the schedule especially if NSR NA or PSD is triggered. The LFGTE example in this article is intended to show some of the considerations that may have to be taken into account, but other applications of engines in power generation may have significantly different issues. ■

Editor's Note: Dave Heitz is a Senior Engineer with GeoSyntec Consultants. He has more than twelve years of experience in air permitting and regulatory compliance with a special emphasis in MSW landfills and landfill gas. He has been involved with virtually all aspects of air permitting and compliance at MSW Landfills including implementation of the New Source Performance Standards for landfills (Subpart WWW), Maximum Achievable Control Technology (MACT) standard for MSW Landfills (Subpart AAAA), State construction air permitting and Title V permitting. He has experience with air permitting and regulatory compliance at landfills in more than a dozen states, primarily in the Southeast. He obtained his chemical engineering degree from Purdue University and is a registered professional engineer. Heitz was a featured speaker at the 2007 EGSA Annual Spring Convention in Savannah, GA.

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Increase Battery Reliability in Your DC Systems to More Than Five 9s

By Roger N. Pocock, Saft Batteries

Is reliability really demanded or is it rarely demanded? Valve regulated lead acid batteries have a reliability factor of less than one 9 whereas upwards of three 9s is easily attainable by using vented or flooded batteries.

The overall cost of the battery and the cost of failure are frequently used in the same sentence but ultimately separated when first cost analysis is applied. All too often, the wrong battery is selected without the owner realizing the situation.

DC systems are widely deployed in substation switchgear, controls in power generation plants as well as uninterruptible power supplies for use in the health, banking and financial fields. In addition, generator starting systems, emergency lighting and fire pumps use a wide range of battery types. The common objective is protection against the loss of something valuable. Should the battery fail, these results can be the loss of vast sums of money.

Batteries vary significantly in terms of Reliability, End of Life Failure Mode, and Expected Life, while the impact of various temperatures, both high and low will influence how long they last and perform. Maintenance is required; batteries cannot be left ignored. Frequently, this is the area which is cut back to save money, at least in the short term.

This Paper will review and comment on the many facets of battery types and offer solutions on how to raise the level of reliability for a given DC system. A good selection process for any battery will result in matching the needs with the expectations in terms of value of money, life cycle cost, costs of failure and the ability to manage a battery to maximize its life and performance.

Battery Types

The types of batteries that are still in service include both lead-acid and nickel-cadmium plate construction. On the lead side, there are Planté, the original pure lead plate type and a range of pasted plates, which include lead alloys with antimony, calcium and selenium. These are generically known as vented lead acid (VLA). There is also a lead battery type, often misnamed as the "sealed maintenance free" battery but more correctly known as the valve regulated lead acid battery or VRLA. On the nickel-cadmium (Ni-Cd) side, there are four plate types in use; these are all vented whereby some have valve regulation to provide extended water intervals.

Lead Acid Technologies: Planté

Developed in 1860, this plate became the benchmark for life and performance against which all subsequently developed lead acid plates are now compared. The Planté can and will operate for well over 20 years and does not require an aging factor when sizing the battery. The plates are not flat with two sides, rather may best be compared to a car radiator with a much increased surface area.

Its limitations are physical size, heavier and more costly when applying first cost analysis. However, life cycle costing will usually result in a positive choice when space is not a limiting factor.

Lead Antimony

In the search for lighter and smaller battery positive plates, the Antimony grid alloy was the first to be exploited. The plate is often called a flat plate or pasted plate whereby a lead oxide paste is applied to the grid. The grid is an alloy of lead with antimony, in excess of 4% to provide rigidity to the otherwise soft lead metal.

While being smaller and lighter, the typical useful life varies with application and may be summed to 12 to 15 years of service. The limiting factor is that the water consumption rapidly increases as the plates age, due to a migration of excess antimony from the positive plate to the negative plate. This process results in increasing negative plate resistance and subsequent water loss. However, this increasing water consumption is a reliable indicator of the demise of the battery. When the plates are excessively thin from acid corrosion, the plates will be easily seen to begin collapsing.

Lead Calcium

This alloy of lead and calcium eliminated the water hydrolysis associated with the antimony alloy. The draw back of this grid alloy is that there is no easy sign of aging of the battery and users have been caught off guard when their batteries failed with no warning. The cause for the unpredictability is due to the nature of the grid alloy. The alloy's crystalline structure may best be described as a loose formation of crystals which are subject to penetration of the acid despite the lead oxide paste's presence over the grid. This corrosive process causes the grid to swell and the paste to separate, albeit, microscopically. Normal maintenance practices of specific gravity readings and cell voltage checks do not give the owner indicators of approaching end of life or performance. In fact, the lead calcium alloy produces a wider spread of cell voltage variations than the Planté or Antimony plates. Frequently, the owner will equalize the battery after noting the wide spread of voltages, only to exacerbate the aging and corrosion of the positive grid.

The real state or condition of the calcium cell may be determined by the introduction of a third electrode into the cell and the subsequent measurement of the degree of polarization between the positive and negative plates; this may be explored in greater depth by reading the paper by David Feder and Gino Carosella, titled "The never ending pursuit of float voltage.."

The calcium alloy grid is widely used in switchgear applications with specific gravities of 1.215. Thinner plates in conjunction with higher specific gravities of 1.250 are routinely deployed in UPS applications. The typical life of this UPS battery is generally found to be 7 to 9 years, although there are exceptions. In general applications, the useful life is in the 12 to 15 years with failure being that of plate collapse and paste separation.

Lead Antimony and Selenium

This lead alloy grid is based upon small levels of antimony and selenium, whereby the antimony is fully dissolved and does not migrate to the negative plates causing excess water loss as with the classic antimony plates. The advantage of this grid over the calcium grid is that the grid alloy comprises of small uniform crystals which are highly resistant to the penetration and corrosion of the acid throughout its life. There are several benefits of this alloy, with the main one being that voltage variations do reliably indicate the health of the battery. Other benefits are higher performance, cycling and better low temperature performance. The acid strength of 1.240 does not corrode the plates as severely as with the calcium plates. The better performance frequently results in smaller battery footprint in switchgear applications. In UPSs, this battery will see lives well over 50% longer than its calcium counterpart. Failure is that of plate collapse and paste separation.

Valve Regulated Lead Acid (VRLA)

In the pursuit for smaller and less expensive batteries, the so called "sealed, maintenance free" was developed in the early 1980s. Since then, the very different behaviors of aging are still being understood. While being smaller and lighter, they do have severe draw backs. The first is that the VRLA fails in the open circuit mode. The second fact is than the expected life ranges from 2 to 10 years. Despite this, they are widely deployed in the UPS field and the telecoms industry. In both these areas, they know the limitations and allow for this in their management approaches.

Many UPS VRLA users will change their batteries every four years, rather than risk costly failures.

Coup de Fouet

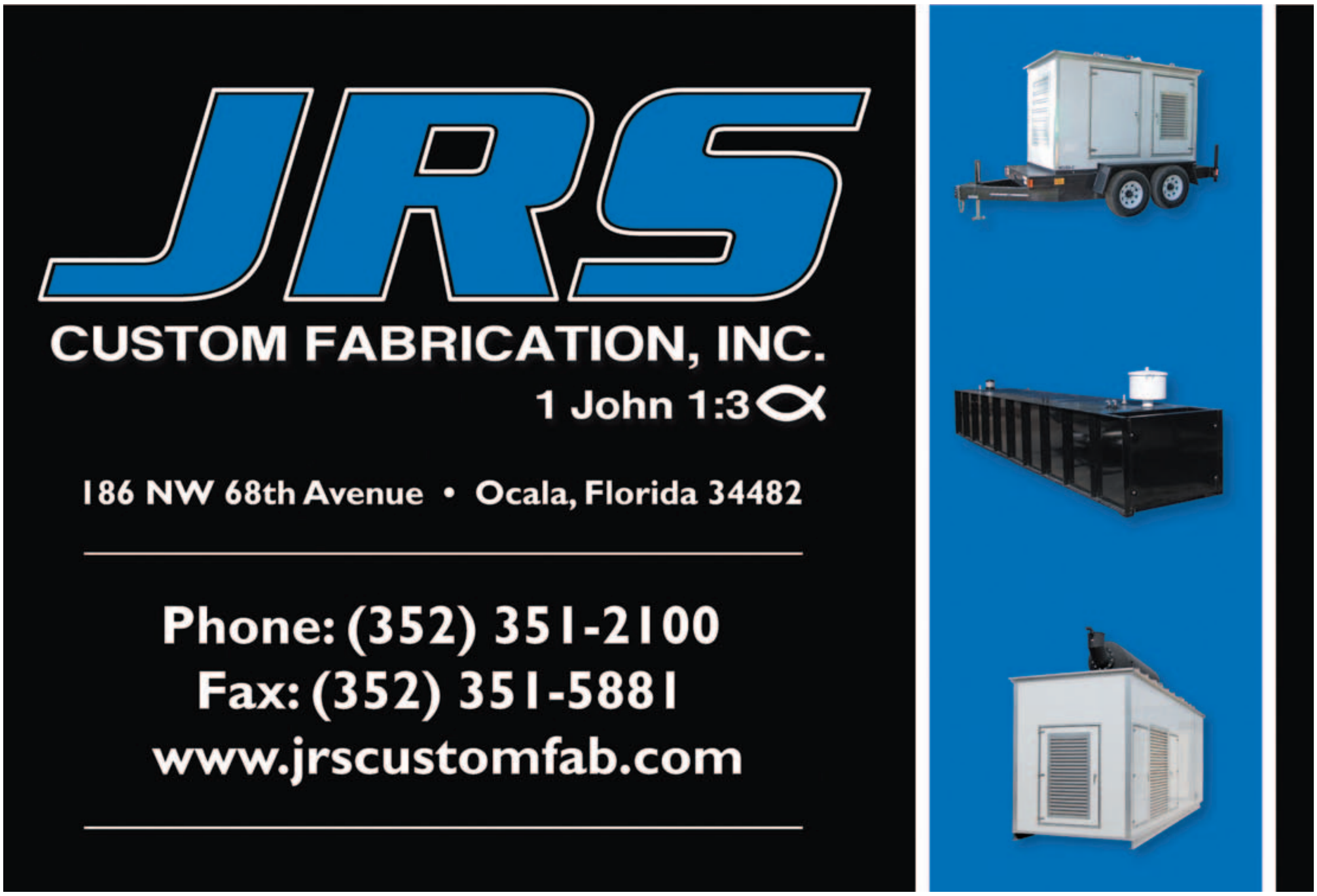
This is a phenomenon peculiar to lead acid plates. During the moments of the first load being applied to the lead acid batteries, the surface crystals change. This is enough that the voltage of the battery will and does drop significantly. In general, this lower voltage is allowed for in the design stage however, as the batteries age, this effect worsens and in short autonomy UPS systems, it has been known that the voltage drops below thresholds, set off alarms and actuate the low voltage disconnects (LVD).

Nickel Cadmium Technology: Pocket Place NiCd

Developed in the early 1900s, the plates are constructed of perforated steel strips, formed into channels, filled with the active material, either the nickel hydroxide (positive plate) or the cadmium (negative plate), capped with another perforated steel strip. These long packaged strips and interlocked and cut to create the desired plate sizes and capacities. There are usually three thicknesses to serve different applications. The electrolyte used does not react with the plates, unlike the actions inherent in the lead acid cells. The result is that there is no sudden failure of plates disintegrating. These plates withstand very high cycling. High temperature does not age these as fast as experienced with all lead acid plates. Low temperatures require less compensation than that needed for lead acid batteries in whose cells the electrochemistry slows down.

Sintered Positive NiCd Plate

This plate design was developed in the late 1920s. The active material is sintered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onto a wide perforated steel strip which is in turn cut to the needed lengths for each cell capacity. Again, they have all the same attributes as the pocket plate described above.

Plastic Bonded Negative NiCd Plate

This plate complements the sintered plate in forming a cell. The active material is suspended in a plastic solution and then applied to a similar steel strip.

As both these plates are very thin, the cells are frequently used in high performance switchgear applications and for engine starting on generators.

Fiber NiCd

The fiber nickel-cadmium plates are produced through vibrating the active materials into fibrous plates. The characteristics of these plates are different from the above described plates and depending upon the applications, they may be larger or smaller in capacity.

The major feature of this type of plate is that the active material will be released from the plates by vibration as light as that found in guided vehicles on smooth cement floors. The results are short circuits between the plates when the sediment rises to the plates.

Reliability

The basic reliability of these several battery types range from extremely low to very high. It may be demonstrated by using an arbitrary cell level reliability factor of 0.995, the two failure modes, open circuit and short circuit, and the cell voltage operating levels, that reliability of serial or parallel strings varies significantly. The progression starts at the low end with the VRLA, moving to much better with the VLA to very high with the Ni-Cd series. This spread of reliability is impacted by two significant factors. With VRLA, the higher the voltage, the lower is the reliability whereas, the higher the voltage of flooded cells, the greater the reliability. If the voltage operating window widens, then the flooded cells' reliability increases further.

VRLA fail open circuit while the usual mode of failure for vented cells, both lead and Ni-Cd is short circuit.

The result is that the reliability of a single string of VRLA cells or blocks is les than "one 9" while a string of vented lead acid cells for the same voltage will be as much as "three 9s" and for the nickel-cadmium, the reliability factor will be even higher at "five 9s".

When these factors are combined with expected life, then the selection processes should become clearer.

Failure Mode

The VRLA will fail "open circuit" which results in sudden failure and the absence of voltage being generated. All lead acid batteries will dramatically lose capacity after their capacity ratings drop below 80%. At this point, there may be 6 to 12 months life still available. On the other hand, the nickel-cadmium technology does not suddenly fail and after the 80% point, there can be many useful years of performance still remaining.

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Expected Years of Service

Lead acid batteries' typical useful lives range from 3 to 8 years for the VRLA, 12-15 years for the vented lead acid batteries up to 20 to 25 years and more with the Ni-Cd. It is not uncommon to find 30-40 yr old Ni-Cd still performing. These numbers are for typical room temperature environments.

Temperatures about 90°F accelerate the aging of all lead acid batteries but not so much for nickel-cadmium batteries. Lead acid batteries lose life at the rate of 50% for every 15°F above 77°F whereas for the nickel-cadmium battery, the factor is around 16%.

Monitoring Systems

Monitoring has always been recommended and is described in detail in the next Paper in more detail.

The advent of the many systems now available in the marketplace came about when users needed to know the health of their battery systems in the easiest manner possible and without taking readings manually. These systems can and often do cost more than the battery being monitored. In the meantime, the dilemma has developed whereby these systems are disconnected because of a higher than expected maintenance as connections loosen. The ultimate challenge for all users is to study, understand and interpret the resultant data. Unless the owner has personnel conversant in battery behavior, the risk is that data is kept and not always used. The results may well be sudden failures of costly proportions.

Maintenance Requirements

Maintenance satisfies several purposes. The first and foremost reason is to predict when a battery may fail. It requires the measurement of various parameters. Secondly, it is to maximize the life of the DC system and thirdly, maintenance records are always required as and when a dialog may occur with the manufacturer when problems arise. Watering intervals will range from annually to every many years, depending on the type of battery installed and its environment. Other checks should include voltage, acid strength and internal impedance. No single parameter should be considered to predict the health of the battery. The more checks, the better is a safe approach.

Each one may or may not reinforce the next. The ultimate test for a battery is the capacity test, which test is not inexpensive. Even before starting the test, a back up battery must be brought in the replace the one to be tested, to protect the system. Should the test result in discovering many bad cells, then the temporary battery would be retained until the replacement is installed.

Conclusions

Each application or task of a battery should be viewed as unique. Each job is different from the next and the idea that one battery can provide good service equally well for all applications will lead to disappointment for the client.

The owner should balance the trade offs between the costs of an unpredicted failure against the initial higher costs as-

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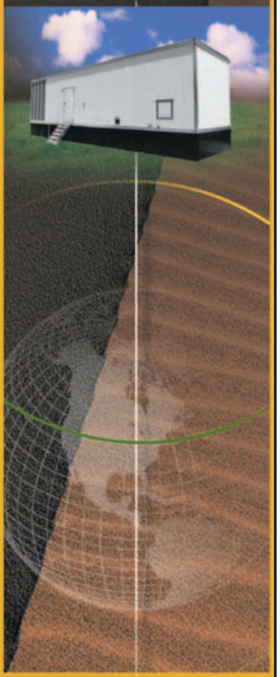

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sociated with a more reliable battery. It is dangerous to expect and believe that using a monitoring system or a policy of frequent battery replacement will result in a higher reliability DC system. It will not.

The owner is strongly urged to invest time in understanding the differences between batteries and work closely with the consulting electrical engineer, which will result in the best reliability level for the application. The joint writing of enforceable specifications will ensure the objective of acquiring a solid and dependable battery system.

It has been presented that the reliabilities from one battery type to the next do vary dramatically. With life cycle costing, justifications in selecting the better or best battery become simple and suddenly, five 9s of Reliability is very achievable.

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Roger Pocock is a Specifications Consultant for Saft America, Inc. He is highly active in EGSA and received EGSA’s William Timmler Award in 2004 for his work with the Codes & Standards Committee

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Reducing Particulates from the Exhaust of Stationary Diesels

By Michael J. K. Pope, Süd-Chemie Inc.

About 99% of the exhaust volume from a diesel engine is non-polluting; it comprises nitrogen, water, oxygen, hydrogen and carbon dioxide (CO2), which is a greenhouse gas but non-poisonous. We can live with this. But the remaining 1% of the volume is a different story. This 1% contains some major pollutants and is consequently regulated by Federal and/or State and local agencies.

It is a chemical certainty that when atomized diesel fuel is ignited, (at 15 "events" per second at 1800 rpm) the subsequent combustion and energy release will result will have several consequences:

1. The energy contained in the fuel rapidly converts to heat energy and increases in volume, forcing the piston down to turn the crankshaft (mechanical energy which is then converted into electrical energy by the generator).
2. The high temperatures at the injector flame tip creates nitrogen oxides (NOx).
3. Incomplete combustion in some areas of the combustion chamber create carbon monoxide (CO).
4. The relatively cool areas in the combustion chamber – cylinder walls, inlet valve(s) also lead to incomplete combustion and create the hydrocarbons (HC) and particulate matter (PM, often referred to as soot).

All engine manufacturers and many research organizations are using huge resources to reduce the creation of these pollutants during combustion. This article will not address NOx and CO reduction strategies. But particulate matter is the pollutant that is about to have the greatest regulatory change in allowable emissions from diesel exhaust. And now that the stationary engine exemption from EPA Certification is no longer applicable, all new diesel engines in the power generation industry will have to conform when these tight regulations kick in.

Particulates consist of a core of carbon, surrounded by other products of combustion that are *stuck* to them—unburned particles of fuel and oil for example. Individual particles are virtually invisible, but collectively they appear as the smoke you see from older diesels on start up and when the genset takes the electrical load.

PM is getting regulatory agency attention because it is a serious health hazard. It is this pollutant that is being targeted by the EPA, CARB and other regulatory agencies around the world. The fact is that PM is an airborne pollutant that we inhale in its presence. Because the particles are so small, they go deep into the lungs, some attaching to the walls of the lungs. According to medical experts, particulate matter can cause lung damage or premature death, aggravate respiratory conditions such as asthma and bronchitis and is likely to cause cancer in humans.

Also, PM contributes to the creation of haze, restricting visibility, contributing to ozone formation, acid rain and global climate change.

There are three main areas of influence available to reduce an engine's harmful exhaust emissions: fuel, combustion and post combustion.

Dirty, impure fuel will have an adverse effect on exhaust emissions. The introduction of low and ultra low sulfur diesel fuel for on road use (October 2006) increases the effectiveness of exhaust after-treatment devices and we will see this spill over to the stationary engine/power generation industry during the next few years.

The Environmental Protection Agency, (EPA) has aggressively attacked the emissions of PM in its regulations, particularly in Tier 4, which become effective for most horsepower nodes in 2012. PM has to be reduced from the Tier 3 level of 0.15 g/bhp/hr to 0.015 g/bhp/hr – a **reduction of 90%.** It is unlikely that engine manufacturers will be able to meet the new targets with purely combustion improvements and so the use of an exhaust after-treatment device is the most viable solution.

The Diesel Particulate Filter (DPF) works just like the air filter at the other end of the combustion chamber. The exhaust enters the DPF from the engine exhaust manifold or turbocharger. The face of the DPF consists of many cells (usually about 200 per in^2). Every open cell at the entrance is blocked at the other end. Every alternate cell is blocked at the entrance but open at the other end. The materials used by most manufacturers are cordierite, a ceramic type of material and silicon carbide.

The exhaust therefore, only has one option: it enters an open chamber but has to pass through the porous wall of the filter into an adjoining chamber that is open at the other end. The PM/soot is trapped at the wall and only clean, filtered exhaust gas is able to exit. *(See Diagram 1).*

Diesel Particulate Filter (DPF)

What happens to the PM? At high engine temperature there is a chemical reaction known as oxidation, in which nitrogen dioxide (NO$_2$) breaks down the PM and coverts it to nitrogen and CO$_2$—which is able to flow through the filter walls and harmlessly into the air. The chemical reaction creates heat energy, referred to as an exothermic reaction, and this further aids the oxidation process as it raises the temperature.

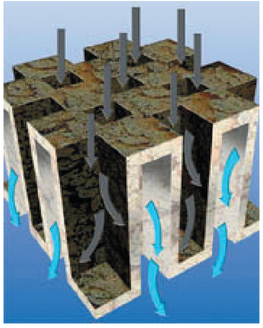
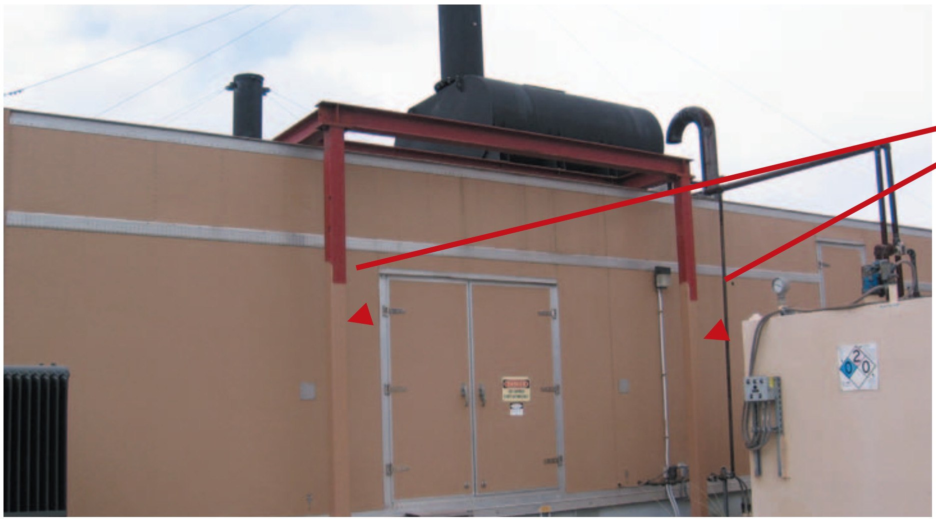


Diagram 1.

This is fine while the engine exhaust temperature is high enough for this reaction to occur. If it is too low, the PM will not get oxidized and will build up in the filter. Gradually the backpressure in the exhaust system will increase as the DPF captures more PM.

There is a point at which the volume of PM entering the DPF is equal to the PM being oxidized. This is known as the balance point temperature (BPT) and under this condition there is no gain or reduction in the particulate matter stored on the filter. If the temperature is below BPT, there will be a gain in the volume of PM stored in the filter, but as it rises above BPT, the PM will be reduced. The BPT is lower with a catalyzed DPF than a uncatalyzed DPF.

DPFs are usually catalyzed with a coat-



2 MW Genset with DPF. Silencer/DPF separately supported (indicated by arrows).

ing of Platinum (Pt), a precious and expensive metal. This has the benefit of oxidizing the carbon monoxide (CO) and hydrocarbons (HC) from the exhaust. It also reduces the BPT, which means that the DPF oxidizes the PM at a lower exhaust temperature. This oxidation process is referred to as **regeneration.**

Sizing the DPF for a specific application requires the engine exhaust flow and temperature data under the normal and maximum operating conditions. An engine may require a single or multiple DPFs (all in parallel, not series) to maintain operation at an acceptable backpressure for the engine and to provide a level of PM storage capacity. DPFs are usually combined with an exhaust silencer in order to make the best use of the space available. But care must be taken on a retrofit application to ensure that the genset structure is capable of supporting the added weight of the DPFs. If not, an independent means of support for the DPF housing may be needed.

Diesel engines used as prime movers for power generation fall into two main categories from a DPF perspective: prime power and standby power. Prime power applications, including cogeneration, CHP, rental, distributed generation, etc. will typically be constantly regenerating a DPF since the exhaust temperature is well above the balance point temperature.

The standby generator set on the other hand, is generally started automatically once each week to go through its exercise cycle of start, run for one hour and shut down. No load, very low exhaust temperature. Under these conditions, the DPF will not self regenerate and before the backpressure reaches a critical point for the engine, a planned regeneration is required. These are the options:

1. Increase the time between auto start exercises beyond the traditional one week and decrease the running time in order to extend the time required before regeneration.
2. Apply the facility load to the genset, thus creating higher exhaust temperature. This will also test the entire generating system, including the transfer switch – providing greater assurance to the facility management that their

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emergency power source is truly ready to take over in the event of utility power failure.

3. Arrange for the set to be run with a load bank, which will also benefit the engine. Load bank service is available from most generator set distributors. Many specifying engineers are now recognizing the benefits of routine genset tests under (partial) load conditions. This has resulted in an increase in the number of new standby generator sets being supplied with a radiator mounted load bank.
4. Remove the filter from its housing and send it to be externally regenerated by an approved service provider. There are procedures for external regeneration in order to prevent thermal stressing of the filter.

Small amounts of lubricating oil in the exhaust stream will burn, leaving ash deposits on the walls of the filter. Eventually, the accumulation of ash will affect the performance of the DPF and it will need to be removed. Since ash is inorganic and non-harmful, it may be removed simply by blowing it out with compressed air, using normal safety procedures.

When a DPF (or any catalyst) is to be installed in a new exhaust system for the first time, the engine should be run under load for about an hour *without the catalyst* to ensure that the exhaust system is clean and clear and prevent any loose pieces from impinging on the front face of the device.

Careful consideration has to be given, at the sizing stage, to the soot carrying capacity of the filters and the backpressure in the total exhaust system. Operating a diesel engine at higher than the manufacturer's maximum allowable pressure can result in increasing crankcase pressure and fuel consumption. For this reason it is recommended that diesel particulate filters be provided with a pressure differential switch. This will constantly monitor the pressure in and out of the DPF and provide an alarm and/or pre-alarm for the system. This may be connected to the genset's control panel and annunciator panel.

Diesel particulate filters are a mature technology in the US. Most US trucks manufactured since the start of 2007 have DPFs installed. 50% of European car sales are diesels and have DPFs as standard equipment. Many of these diesel powered cars will be introduced to the North American markets in 2008. The 2007 24 Hour sports car race at Le Mans was won by a diesel car with a DPF for the second consecutive year. And an increasing number of engines in the power generation industry are going to have a DPF in the exhaust system, even before being required by the Federal government. No more exhaust smoke on start up, and not much of the traditional smell of diesel. What is the world coming to? ■

Michael Pope is the Marketing Manager and Senior Sales Engineer at Süd-Chemie Inc., a Massachusetts manufacturer of catalysts for engines and gas turbines. He currently serves on the EGSA Board of Directors.

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MIRATECH Announces Appointments

TULSA, OKLAHOMA – MIRATECH Corporation has announced a series of appointments to its engineering and sales teams.

Rachel Stephens has been named Applications Engineer. Stephens will use her experience to develop engineering project plans and provide technical application support for the company's expanding line of industrial engine air pollution control devices.

Prior to joining MIRATECH, Stephens held an applications engineering position, in which she provided custom product solutions and engineering support for the sales department in a large HVAC company. She also worked directly with sales and customer service to streamline the order process to shorten lead times and reduce warranty replacements. Stephens received a Bachelor of Science in Mechanical Engineering, graduating with honors from The University of Oklahoma and holds EIT certification.

Dan Farrington also has been named Applications Engineer. Farrington will use his project management training and familiarity with gas engines to provide sizing and specifications of custom products, generate sales and fabrication drawings, and build proposals for specialized products within the company's expanding line of industrial engine air pollution control devices.

Farrington received a Bachelor of Science in Mechanical Engineering from Kansas State University and has a significant background in the design and testing of gas machinery that includes supervision of the KSU National Gas Machinery Laboratory as well as participation in various design projects and challenges.

Josh Thompson has joined MIRATECH Corporation as a Project Engineer. Using experience with Solidworks and design optimization, Thompson will support the MIRATECH engineering, production and sales groups. Prior to joining the company full-time, Thompson participated in MIRATECH's internship program while finishing his degree in Mechanical Engineering at The University of Tulsa.

Mark Nichols has been named MIRATECH's Power Generation Division Regional Sales Manager for the Midwestern United States. Based in Houston, Texas, Nichols will assume responsibility for managing and growing MIRATECH's Power Generation product category throughout the North American central time zone.

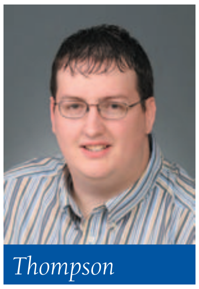
Nichols brings more than 30 years of sales and marketing experience from both the electric power generation industry plus the oil and gas industry to this new MIRATECH position. Before joining MIRATECH Nichols' career included numerous assignments with Stewart & Stevenson (oil & gas equipment and support) as well as with General Electric Power Systems (industrial energy services). His energy industry professional background includes a variety of sales and marketing management positions in North and South America, Europe and Asia.

MIRATECH Corporation is a leading provider of stationary industrial engine emission control solutions. For more information, visit *www.miratech.com*.

Industry News is continued on page 33

Stephens

Farrington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Nichols

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Application for Membership

ELECTRICAL GENERATING SYSTEMS ASSOCIATION

1650 South Dixie Highway, Suite 500, Boca Raton, FL 33432 • (561) 750-5575 • FAX (561) 395-8557
E-Mail: *e-mail@egsa.org* • World Wide Web: *www.egsa.org*

EGSA's mission is to bring together representatives of the various segments of the On-Site Power Industry, to learn, share ideas and experiences, advance the science of On-Site Power generation, improve performance and profitability of members, and the quality of service to power users.

1. Contact Information

Please type or print all information in upper and lower case (NOT ALL CAPS!)

Company ____________________

Address ____________________

City ____________________ State/Province ____________________

Zip/Postal Code ____________________ Country ____________________

Phone ____________________ FAX ____________________

Official Representative ____________________ Title ____________________

Representative's E-Mail ____________________ Company's Web Address ____________________

How did you hear about EGSA? ☐ Web site ☐ *Powerline* magazine ☐ Colleague ☐ POWER-GEN ☐ Other ____________________

Why are you joining EGSA? ☐ Certification Program ☐ CEU Program ☐ Power Schools ☐ Buyers Guide Listing ☐ Other ____________________

2. Member Classification

Read the Membership classifications below and check the box that describes your firm's classification.

I. FULL MEMBERSHIP

☐ MF **Manufacturer Membership**
Any individual, sole proprietor, partnership or corporation seeking membership must apply for a Full Membership as a manufacturer if they meet one or more of the following criteria:

1. They manufacture prime movers for power generation.
2. They manufacture generators or other power conversion devices producing electricity.
3. They manufacture switchgear or electrical control devices.
4. They manufacture or assemble generator sets, UPS systems, solar power, hydropower, geothermal, or any other power production or conversion system including related components or accessories for national or regional distribution.
5. They are a wholly owned subsidiary of a firm which qualifies under rule one through four.

☐ DD **Distributor/Dealer Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a distributor or dealer for products listed under Manufacturer Membership may apply for Full Membership as a Distributor/Dealer. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

☐ MR **Manufacturer's Representative Membership**
Any individual, sole proprietor, partnership or corporation actively engaged in the representation of products listed under Manufacturer Membership may apply for Full Membership as a Manufacturer's Representative. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

☐ EM **Energy Management Company Membership**
Any individual, sole proprietor, partnership or corporation engaged in energy management, including Energy Service Companies (ESCOs), Independent Power Producers (IPPs), Integrators, Aggregators, and other similar enterprises may apply for Full Membership as an Energy Management Company.

☐ **Associate Full Membership** (mark appropriate category at right)]
Any individual, sole proprietor, academic institution, student, partnership or corporation meeting the requirements of Associate Regular Membership may apply for Full Membership at their option to enjoy the privileges of Full Membership, including the rights to vote and to serve on EGSA's Board of Directors. Initiation fees and annual dues will be assessed at the existing non-manufacturers' Full Member rates.

II. ASSOCIATE REGULAR MEMBERSHIP

☐ AA **Trade Publication Membership**
Any trade publication dealing with the electrical generating systems industry or its suppliers may apply for Associate Membership—Trade Publications.

☐ AB **Trade Association Membership**
Any trade association made up of individual or company members sharing a common interest in the electrical generating systems industry may apply for Associate Membership—Allied Associations.

☐ AC **Engineer Membership**
Any consulting or specifying engineer may apply for Associate Membership—Engineer. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

☐ AD **End-User Membership**
Any individual employee of a company who owns or operates electrical generating equipment and/or related switchgear or components, whose responsibility to his employer includes planning, design, installation, supervision, or service of such equipment may apply for Associate Membership—User. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

☐ AE **Service Membership**
Any individual, organization or academic institution that offers services such as research, testing or repair to the electrical generating systems industry may apply for Associate Membership—Services. Membership may either be held in the individual's name or the organization's name under this classification. Individual companies whose employer or parent organization qualifies as a Full Member, as described in the Full Membership section, do not qualify for this category.

☐ AG **Educational Institution Membership**
Any postsecondary vocational-technical school or college offering on-site power generation-related instruction may apply for Associate Membership-Education Institution.

☐ AR **Retiree Membership**
Any individual who retires from a member company may apply for Associate Membership—Retired. This classification does not apply to any individual who is employed more than 20 hours per week.

☐ AF **Student Membership**
Any individual currently enrolled at an academic institution may apply for Associate Membership—Student.

FOR BOARD OF DIRECTORS USE ONLY

☐ YES ☐ NO Date: ____________________

Name (Print) ____________________

Signature ____________________

FOR OFFICE USE ONLY

Amount Paid $ ____________ Check Number ____________

Date Received ____________ Date Processed ____________

Mentor Assigned Committee Interest

Application for Membership – page 2

Dues Schedule (Use for Section 3)

	Annual Dues	**Initiation Fee**	**TOTAL**
Manufacturer	$825	$200	$1025
Energy Management Companies	$825	$200	$1025
Distributor/Dealer	$285	$100	$385
Manufacturer's Rep	$285	$100	$385
Regular Associate Member	$200	$100	$300
Full Associate Member	$285	$100	$385
Retiree Member	$90	$0	$90
Student Member	*Complimentary*	$0	$0

NOTE: A FULL 12-MONTH DUES PAYMENT MUST BE RECEIVED WITH THIS APPLICATION. The Association's Membership Year is January 1 through December 31. Dues payments that extend beyond the first Membership Year will be applied to the second year's dues.

FULL PAYMENT MUST BE RECEIVED WITH APPLICATION.

3. Membership Dues (Please fill in the appropriate TOTAL amount from the above dues schedule.)

Membership Dues	$__________
Membership Plaque (optional)**	$ 39.95**
On-Site Power Reference Book (optional)**	$ 125.00**
Florida Residents: Add 6.5% Sales Tax to ** items	$__________
*Continental US Residents add $5 shipping/handing to**items.*	$__________
*Non Continental US Residents should call EGSA Headquarters for shipping charges for **items.* **TOTAL**	$__________

4. Payment Method (Payable in US$ drawn on U.S. bank, U.S. Money Order, or American Express)

☐ Check #______________ Amount $ ___________

☐ Money Order

☐ Mastercard ☐ Visa ☐ American Express

Card # ______________________________ Exp. Date _______

Signature: ____

Print Name: ____

5. Products/Services

Please describe the nature of your business (50 words or less, NOT ALL CAPS) If you are a Manufacturer's Representative or Distributor, please indicate which manufacturers you represent and/or distribute for:

____

____

____

____

____

____

Available Codes:

01 ---Batteries/Battery Chargers
02 ---Control/Annunciator Systems
04 ---Enclosures, Generator Set
05 ---Engines, Diesel or Gas
06 ---Engines, Gas Turbine
07 ---Engine Starters/Starting Aids
08 ---Filters, Lube Oil, Fuel or Air
28 ---Fuel Cells
03 ---Fuel Tanks and Fuel Storage Systems
09 ---Generator Laminations
10 ---Generator Sets
11 ---Generators/Alternators
12 ---Governors
13 ---Heat Recovery Systems
14 ---Instruments and controls, including meters, gauges, relays, contactors, or switches
15 ---Load Banks
16 ---Motor Generator Sets
17 ---Radiator/Heat Exchangers
18 ---Relays, Protective or Synchronizing
19 ---Silencers/Exhaust Systems/Noise Abatement
20 ---Solenoids
21 ---Swtichgear and Transfer Switches (Automatic or Manual), Bypass Isolation Switches, and/ or Switchgear Panels
22 ---Trailers, Generator Set
23 ---Transformers
24 ---Uninterruptible Power Supplies
25 ---Vibration Isolators
26 ---Voltage Regulators
27 ---Wiring Devices or Receptacles

Enter codes here:

Products sold: __________________
____

Products rented: ______________
____

Products serviced: _____________
____

Do you buy AND sell equipment? ☐ Yes ☐ No Do you manufacture packaged equipment? ☐ Yes ☐ No

6. Sponsor(s)

: A"Sponsor" is an EGSA Member who interested you in filling out this application. It is not mandatory that you have a sponsor for the Board to act favorably on this application; however, if a Member recommended that you consider membership, we request that individual's name and company name for our records.

Sponsor Name ____Company Name ____

7. Official Representative's Authorization

Signature ____Date __________________________________

Continued from page 30

New Edition of ASTM International Fire Standards Available

The 7th Edition of ASTM International Fire Standards and Related Technical Material is now available in print and CD-ROM. The new two-volume set provides 246 ASTM standards, seven California Technical Bulletins, eight CFRs, and eight FM Global Fire Test Methods, all of which play a vital role in many aspects of fire and fire-related properties.

The documents in this new edition include test methods, practices, specifications and guides that are used to analyze and assess fire performance of materials, products and systems within their relevant environment. Standards cover the fire properties (including ignition, burning rate, flame spread, heat and smoke release) of:

- Construction materials, including wall, window and door assemblies; wall coverings and other interior finish; gypsum wallboard; and thermal insulation;
- Furniture and furnishings;
- Electrical and optical fiber cables;
- Apparel and textiles;
- Plastics;
- Petroleum products;
- Fire retardancy of paints;
- Wood products;
- Products present in ships and in detention facilities; and
- Consumer products such as children's playgrounds, lighters and candles.

The book is a valuable technical resource for building code officials, fire services, the fire research community, fire prevention engineers, fire testing laboratories, manufacturing companies, and all of those who are interested in the issue of fire safety and fire testing.

Copies of ASTM International Fire Standards and Related Technical Material, 7th Edition, are available for sale online at *www.astm.org*.

ASTM International is one of the largest international standards development and delivery systems in the world. ASTM standards are accepted and used in research and development, product testing, quality systems, and commercial transactions around the globe.

Saft Honored with Prestigious Silver Medalist Award

Defense Supply Center Richmond (DSCR), the aviation supply and demand chain manager for the Defense Logistics Agency (DLA), has recognized Saft with a Silver Best Value Medalist award for outstanding vendor performance. Saft is a leading manufacturer of specialized batteries and was selected for the award based on its exceptional product quality and delivery performance.

Each year, DSCR recognizes vendors for excellent performance as measured by the Automated Best Value System (ABVS). The ABVS determines a DSCR Center Score by extracting vendor performance information from the DLA database. Best Value

Industry News is continued on page 39

Remember Chillicothe Metal when seeking superior design and fabrication services. Chillicothe Metal, a name worth remembering. Take a load off your mind with Chillicothe Metal's total service approach to power systems integration and equipment protection. Our experience, resources, innovation, and willingness to design around your specific needs-even on the most challenging specifications-are why we are tops in the generator packaging industry. From start to finish, it's Chillicothe Metal Co., Inc. Call 309.274.5421 or visit us at cmcousa.com.

CMCO

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Stay on Top of Your Game with EGSA's Electrical Generator Systems Technician Certification Program

Think things move pretty fast in today's business world? Think how fast they'll be moving one, five or even 10 years down the road. That's why you need every advantage to stay on top.

It's no secret that technology is becoming more complex—not less—and that makes today's On-Site Power Generation System a lot more expensive. End-users—your customers—don't want just anybody with a basic knowledge of mechanics to install and maintain their equipment. They want to be confident that all work has been performed by qualified personnel. Suppliers want assurance that skilled technicians are performing maintenance and repairs to guard against unnecessary returns or warranty repairs.

As Good as Your Word

In the past, your word was the only assurance that your technicians are skilled and knowledgeable. But now, through EGSA's Electrical Generator Systems Technician Certification Program, there is a way that you can back up those words with objective evidence of your technicians' proficiency.

EGSA offers you a big advantage: For the first time in our industry, we have an objective and accurate way to determine generator technician proficiency. That means that the same standards will be used to measure the skills and knowledge of technicians from Maine to Manitoba and Mexico. Yes, Manitoba and Mexico! EGSA has determined that there is no reason why the test could not be fairly applied to any NAFTA technician.

What are the Benefits?

For the Employer, certification helps ensure that your technicians have the critical knowledge and skills to succeed in their jobs. And everyone will be comfortable knowing that your certified techicians' expertise has been confirmed by *the* industry organization through a program that was developed by a university. Encouraging and helping your technicians become certified signifies your commitment to the highest of standards. Plus, it lends an added level of credibility to your firm and can sharpen your competitive edge. Employing certified techs will promote customer satisfaction and you won't have to be shy about offering assurance that your techs are qualified. Certification can also help you select potential new hires, analyze job performance, evaluate employees and motivate technicians to enhance their skills and knowledge.

Think about the message that certification sends to those with whom you do business. Why would anyone want a technician who isn't certified performing critical maintenance or repair tasks? Employing certified technicians gives you an added tool with which to market your business.

As our members have said, "We've seen too many backyard mechanics damage expensive equipment. This program will provide credibility for my company and will help build pride and a commitment from technicians to be the best."

For the Technician

Certificate holders benefit too. Certification shows employers, clients, and associates that you are committed as a professional. It provides recognition of your knowledge and skill, shows your commitment to your profession and can help with job advancement. Certification is a mark of excellence that you carry with you everywhere you go.

Acquiring certification indicates that you have the knowledge and proficiency required to perform as an Electrical Generating Systems Technician professional. Becoming certified can increase your salary, enhance your skills, and make your job more satisfying.

Certification helps ensure that your technicians have the critical knowledge and skills to succeed in their jobs.

The Certification Test

EGSA collaborated with Ferris State University to develop the certification test and program. Through a scientific process, our panel of technical experts identified 12 duty areas (such as "Basic Electricity") and 61 tasks (such as "demonstrate knowledge of AC electrical theory") within the duty areas. The duty areas and tasks were ranked and rated in terms of their relative importance, the frequency with which a task is performed, and skill level (i.e. Senior/Expert; Intermediate; and Entry Level.) All this data was combined to develop the certification test that was then statistically validated through a pilot test taken by generator technicians from across the United States.

Who can take the Test?

There are no pre-qualifications for taking the EGSA Certification test. We recommend three or four years of field experience before taking the test. Technicians who have had formal education in On-Site Power Generation (a degree or certificate from a technical school or community college) may need less field experience. Those who pass the test will have a comprehensive knowledge of basic electricity, the functions of a gen-set's mechanical and electrical components, the interactions and relationships among components and an understanding of various elements of the installation, service, maintenance, and repair of gensets and On-Site Power Generation Systems.

CERTIFICATION TESTING COVERS:

- *Automatic Transfer Switches*
- *Communication & Documentation*
- *Engine Generator Instrumentation & Controls*
- *Multiple Generator Switchgear & Controls*
- *Troubleshooting System Problems*
- *Auxiliary Support Systems*
- *Basic Electricity*
- *Prime Movers*
- *Governors*
- *Voltage Regulators*
- *Generators/Alternators*

Use the Study Guide to Prepare!

Use of the program's Study Guide is an excellent way to help techs prepare for the test and should clearly indicate if they are ready to take (and pass) the certification exam. In addition to useful formula pages, the guide contains almost 200 multiple choice practice questions that cover all parts of the certification test. In addition to identifying the correct answer, the guide also indicates in most cases why a particular choice is correct and why the others are incorrect. The Guide also identifies resource material where techs can get additional or more in-depth information about a given topic.

Need more information? Visit *www.egsa.org* to find extensive and detailed information about the certification program. Or contact EGSA Director of Education George Rowley via e-mail at *g.rowley@egsa.org*.

DISCLAIMER OF LIABILITY

Certified status is an indication that an individual has completed a combination of defined education, experience or examination requirements. However, Certification is not a guarantee or assurance of the competence or ability of any particular individual. Further, given the rapid changes in the field, the Electrical Generating Systems Association cannot warrant that the Examination and other Certification materials will at all times reflect the most current state of the art.

The Electrical Generating Systems Association disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the Certification Program or the acts or omissions of any person who has been Certified by the Electrical Generating Systems Association. In conducting the Certification Program, including issuing Certifications, the Electrical Generating Systems Association is not undertaking to render professional or other services for or on behalf of any person or entity, nor is the Electrical Generating Systems Association undertaking to perform any duty owed by any person or entity to someone else. Anyone using the services of a person who has been Certified should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

Electrical Generating Systems Association
1650 S. Dixie Hwy, Suite 500 • Boca Raton FL 33432
561/750-5575 • Fax: 561/395-8557 • *www.egsa.org*

EGSA
Electrical Generating Systems Association

EGSA JOB BANK

Generator Field Technicians

TAW, Inc. is searching for experienced Generator Field Technicians in Tampa, Ft. Myers and Pompano Beach and Orlando, FL. Duties include: inspections, repairs, services and start-up of generators and ATS. Troubleshoot Generators and automatic transfer switches. E-mail resume to *ellen.donegan@tawinc.com*. Fax (813) 612-2609. AA/EOE. DFWP. Check out our web site *www.tawinc.com.*

SERVICE MANAGER WANTED

Contact Rodney Weimer
Gillette Generators
1340 Wade Dr., Elkhart, IN 46514
RWeimer@gillettegenerators.com

Generator Field Service Technician

Penn Power Systems a leader in the Power Generation Industry is currently accepting resumes for Field Service Technicians for our Central and Western Pennsylvania territories. Candidates will have no less than 3 years experience in either the Electrical or Mechanical fields. With a focus on diesel, gas, and propane engines. An understanding of relay and solid state logic is a must. Please forward your resume to Jason Sally, Human Resources, email: *jsally@penndda.com* or fax (215)335-5013 EOE M/F/D/V

EMERGENCY POWER SYSTEM SPECIALISTS

Generator Technician—Experienced

Emergency Systems Service Company in Quakertown, PA, a leading provider of emergency generator sets, has an immediate opening for a technician with a minimum of three years diesel engine/generator set background/experience. Responsibilities will involve troubleshooting, repair and the planned maintenance services of generator sets and peripheral equipment. A neat appearance, clean driving record and good people skills are required. We offer a highly attractive compensation with an outstanding benefits package. A company vehicle and additional training provided. If you are interested in becoming part of our team, please call **(215) 536-4973, ext. 25.**

Generator Technician–Apprentice

Emergency Systems Service Company in Quakertown, PA, a leading provider of emergency generator sets, has an immediate opening for a person with a strong mechanical/electrical background interested in a career in the power generation service field. Responsibilities will involve minor troubleshooting, repair and the planned maintenance services of generator sets and peripheral equipment. A neat appearance, clean driving record and good people skills are required. An outstanding benefits package, company vehicle and additional training provided. If you are interested in becoming part of our team, please call **(215) 536-4973, ext. 25.**

Mechanical Engineer

Miami based Generator Set manufacturer with very competitive benefits and compensation package has an immediate need for a Mechanical Engineer, the applicant will design, develop and test all aspects of mechanical components, equipment and machinery. The applicant will apply knowledge of engineering principles to design power generation products such as engines, controls, machines, etc. Desired qualifications include BSME along with 5 to 10 years of progressive experience designing power generation units. Applicants please submit your resumes to: *francesa@tradewindspower.com* or fax to 305-593-9447.

Outside Generator Service Sales Representative

TAW Inc is seeking experienced Outside Service Sales Representative in Fort Myers, Orlando and Pompano Beach, FL The qualified candidate will sell generator repair services to new and existing clients. Will travel to customer sites within Fort Myers, Orlando and Pompano Beachand the surrounding areas. Will prepare quotes and proposals. Prior technical knowledge and experience in selling generator products and/or industrial sales desired. E-mail resumes to *ellen.donegan@tawinc.com* or fax 813-217-8076. AA/EOE. DFWP. Check out our web site *www.tawinc.com*

Field Service Technicians

Engines and Generators

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Richmond, VA Chesapeake, VA

EGSA Job Bank Guidelines—EGSA will advertise (free of charge) EGSA Members' job openings each issue in the Job Bank. Blind box ads using the EGSA Job Bank address are available upon request. Companies who are not members of EGSA may utilize the Job Bank for a $300 fee. Please note that company logos may be included for an additional fee. Please send your classified ad (limited to about 50 words) to: **EGSA Job Bank**, 1650 S. Dixie Hway, Suite 500, Boca Raton, FL 33432. Or, send it via e-mail it to: *J.Kellough@EGSA.org*

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EGSA JOB BANK

Generator Set Sales/Service

Experienced sales/service engineer needed by southern California company to sell engine generator sets.
Please respond to *J.Kellough@EGSA.org*
(Reference PLND06JB-1).

Ring Power® **CAT**

Power Systems Division

Engineering Manager

Ring Power - Power Systems Division

Ring Power Corporation, The Caterpillar Dealer for North and Central Florida has an immediate opening for an experienced Engineering Manager. Ring Power's Electric Power and Industrial markets continue to grow and the qualified individual will be part of an dynamic group of professional sales, engineering, and administrative staff. Based in St. Augustine, Florida you will manage a diverse and experienced Project Management Team as well as Customer and Vendor relationships.

Qualifications:
- B.S. in Mechanical or Electrical Engineering
- 10 years experience in the Industry
- 5 years management experience
- Professional attitude
- Good communication and organizational skills

Send your resume to: *recruiter@ringpower.com* or visit *ringpower.com* to apply on line or call 1.866.421.7464

Inside Project Coordinator

Zabatt Inc. a leading Industrial generator supplier of Generac Power Systems products has an opening in it's Jacksonville, FL office for an experienced Project Coordinator. The degreed candidate should be organized, detail-oriented, able to multi-task and possess highly effective oral and written communication skills. Electrical background helpful but not required. Responsibilities include coordinating and managing projects in addition to supporting the sales team and an extensive customer network. Strong, sound decision making required daily. Salary is commensurate with experience and includes a full benefits package with matching 401K plan. Help with relocation will be considered for the right candidate. This is a smoke-free workplace. Forward resume along with salary requirements to *steveh@zabatt.com*

Service Manager

Leading provider of Generator Sets & ATS Service in sunny Florida has an immediate opening for a Service Manager. Duties will include receiving service calls, scheduling repair and emergency repairs, billing etc.... We offer compensation equivalent to experience. Outstanding benefits package. If you are an ambitious, self-motivated, business-minded individual who has a team player attitude, please fax your resume and salary history to 352-732-0225 or email to *app2u@yahoo.com.*

ALTORFER
Power Systems
CAT

EPG Field Service Technician

Exciting opportunity is waiting for the right person to join our Bartonville, IL service team! Perform diagnosis, repairs and maintenance on Caterpillar Electric Power Generation equipment. This includes switchgear and electrical controls. Ability to read electrical schematics and engine experience required. PC skills and excellent customer service skills required.

Please e-mail resume to:
power@altorfer.com

Engine/Generator Mechanic

Seasoned Engine/Generator Mechanic wanted for northern Virginia area. Flexible work schedule with growing company. 20 years experience preferred. Candidates must have firsthand knowledge of traffic dynamics in the No-VA, MD and DC area and be able to arrange their workday to minimize lost time in traffic while completing their assigned work in a high-quality, timely manner. Send introductory letter and resume to *customerservice@gentune.com.*

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Mid America Engine, Inc.
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Keith: keith@maegen.com
Art: art@maegen.com

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Get an On-Site Power Education.

Get CEUs.

Get Satisfaction.

Whether you are a newcomer to the On-Site Power Generation Industry or a veteran already working with power generation technology, EGSA's On-Site Power Generation Schools offer you comprehensive information you won't find anywhere else.

While newcomers receive an outstanding introduction to On-Site Power Generation Systems, veterans tell us that our schools provide a great and very meaningful review of critical material. Everybody benefits by getting the most up-to-date information available that is presented by seasoned professionals from some of the biggest companies in the industry.

From voltage regulators to transfer switches to sizing and service, we cover it all in a three-day event. And every student receives a copy of EGSA's 597-page *On-Site Power Generation Reference Book* (a $225 value) and extensive handout materials.

What's more, you can extend your learning with two extra days of optional sessions that cover prime mover fundamentals, basic electricity, troubleshooting, specifications and bid documents and multiple generator configurations.

With our Continuing Education Unit program, you can earn up to 3.1 CEUs. By earning CEUs you can not only take pride in your accomplishments and knowledge, our CEUs might give you an advantage during your next performance review and your employer will know that the investment in your training has been money well spent. Plus, CEUs may help maintain licenses and professional society membership. When you register for the school, be sure to sign up to take the Continuing Education tests.

For complete information on EGSA's On-Site Power Schools—including a schedule and registration materials—and full details on our Continuing Education program, visit us online at *www.EGSA.org*.

Electrical Generating Systems Association
1650 South Dixie Highway, Suite 500
Boca Raton, FL 33432
Email us at e-mail@egsa.org
Visit us online at www.EGSA.org

Continued from page 33

Medals are awarded in Gold, Silver and Bronze, based on total DSCR Center Score. Saft received a Silver Best Value Medalist award by achieving a DSCR Center Score of 99.0 - 99.9. For more information, visit Saft at *www.saftbatteries.com*

WHI Capital Partners Acquires Victory Industrial Products, Inc.

WHI Capital Partners (WHICP), a Chicago-based private equity firm, has announced its acquisition of Ohio-based Victory Industrial Products, Inc., a leading manufacturer of custom enclosures and fuel tanks for power generating units.

Chicago-based WHICP is a private equity firm targeting lower middle market investments in leading niche manufacturing, value-added distribution and specialty service companies with revenues between $10 – 100 million. Terms of the Victory acquisition were not disclosed.

"The demand for diesel gensets has increased over recent years and continues to grow as businesses address their back-up power source needs. Victory is ideally positioned to capitalize on that demand," said Eric Cohen, WHICP's managing partner. "We are very excited about the opportunities in the market, as well as working with the existing management team, which did an exceptional job building the business."

WHICP has recruited Bob Carter as Victory's chief executive officer. Carter has a 30-year track record in manufacturing and operations, most recently as CEO of a commercial and off-road/construction vehicle wire harness manufacturer. ■

FOR SALE/RENT

(2) 2.5MW EMD MP-45
(3) 2.0MW EMD MP-36
50 / 60 CYCLE
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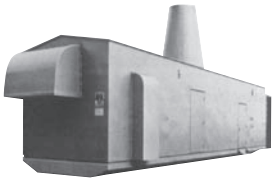

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NEW EGSA MEMBERS

Andrew Kilgour (AF)
New Market ONCanada
(905) 895-1468
Contact: Andrew Kilgour
Business: Electrical Power Generation student at Fleming College in Lindsey, ON, Canada.

Antilles Power Depot (DD)
Carolina PR
(787) 622-9330 Fax: (787) 622-9333
Contact: Jason G. Hebert, President
Business: Sales, service, rental, installation and engineering generators, automatic transfer switches, fuel systems, UPS systems and alternative energy systems.

Austen Electric Inc. (DD)
Medley FL
(305) 805-8166 Fax: (305) 805-8190
Contact: J.C. Shawn Crow, President
Business: Our services include all aspects of the electrical industry for commercial, industrial, and residential arenas.

Brandon LaVergne (AF)
Cottonport LA
(318) 876-2401 Fax: (318) 876-2634
Contact: Brandon LaVergne, Student
Business: I am currently enrolled in a diesel power and technology program given by Louisiana Technical College. The program does not include any information on generator power equipment, therefore, I took it upon myself to seek the information through EGSA. It is my goal to become certified though EGSA in the future.

Chuck Kaatz (AE)
Maple Grove MN
(763) 550-9578
Contact: Chuck Kaatz, Electrician
Business: Electrician seeking a career in the on-site power industry.

Depco Power Systems (DD)
Houston TX
(713) 675-6100 Fax: (713) 675-6600
Contact: Tadd Stickler, Vice President
Business: Depco stocks a variety of new, used, and rebuilt generator sets from Detriot Diesel, Caterpillar, and Cummins as well as new generator sets and transfer switches manufactured exclusively for us.

Diesel Service & Supply Inc. (DD)
Brighton CO
(303) 659-2073 Fax: (303) 659-7923
Contact: Theresa Dingle
Business: Diesel Service & Supply, Inc. buys and sells new, surplus and used industrial diesel power generators with a focus on gensets from 50 kW to 3 MW. They sell only low-hour, high-quality equipment from well known OEMs. They do not broker other dealers' inventory.

Elecon Services Inc
d.b.a. Esposito's Electric (AE)
Denville NJ
(973) 366-9902 Fax: (973) 366-8830
Contact: Christopher Dufford, Service Mgr
Business: Electrical design, build and maintenance for residential, commercial and industrial clients.

ENTEC Services, Inc. (AE)
Peoria IL
(309) 697-2122 Fax: (309) 697-8119
Contact: Mark D. Auer, President
Business: ENTEC Services, Inc. is a commercial and industrial HVAC and generator service provider. ENTEC has been serving clients throughout Central Illinois and Eastern Iowa for over 25 years. ENTEC services multiple lines of generators with factory certified technicians.

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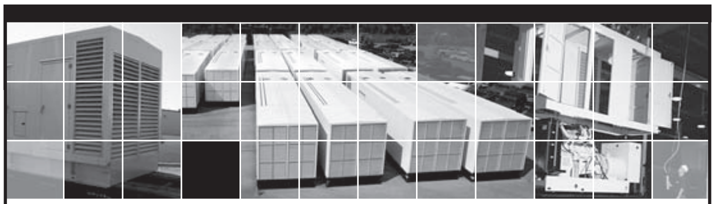

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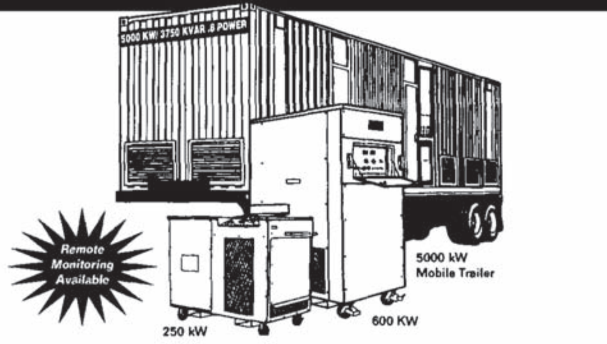

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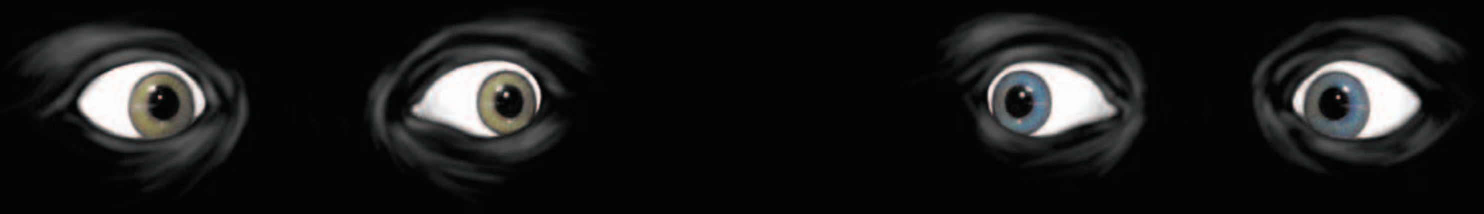

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(781) 938-9100 Fax: (781) 933-7812
Contact: Owen M. Duffy, President
Business: Kohler Generator & Waukesha Engine distributor; Engine Distributor for: Mitsubishi, Deutz, Lombardini, Lister-Petter, Aprow.

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(707) 984-7323 Fax: (707) 984-7106
Contact: Toby Mullins, CEO
Business: Norcal services, sells and repairs diesel generators for both prime and standby applications. We are an authorized dealer for MQ Power, Wacker, Kubota Engines, Isuzu PT, and Volvo Penta.

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Contact: Harold Jarrett, President
Business: OmniMetrix provides wireless remote monitoring services for onsite power applications.

Premium Power Services, LLC. . . . . (AE)
Kennett Square PA
(610) 444-1232 Fax: (610) 444-2120
Contact: James Marks, Vice President
Business: Premium Power Services, LLC provides electrical switchgear testing and maintenance, generator set sales/service/rental, UPS sales/service, power system engineering and design, project management and construction services, energy monitoring and power.

Propace Ingenieria S.A. . . . . (DD)
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Shane Erdmann . . . . (AF)
Greeley CO
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Contact: Shane Erdmann
Business: Electrical engineering student

Standby Power Enterprises LLC . . . . (DD)
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Contact: Aaron Henkind, Owner
Business: Sales, service and installations of high quality standby and emergency generator sets, as well as, transfer switches by Cummins Power Generation and Kohler Power Systems.

Storm Power Services Co. . . . . (AE Full)
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Contact: David Israel, President
Business: Service & repair of generators from 5 KW - 5 MW, controls and switchgear.

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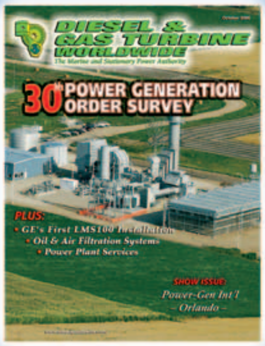
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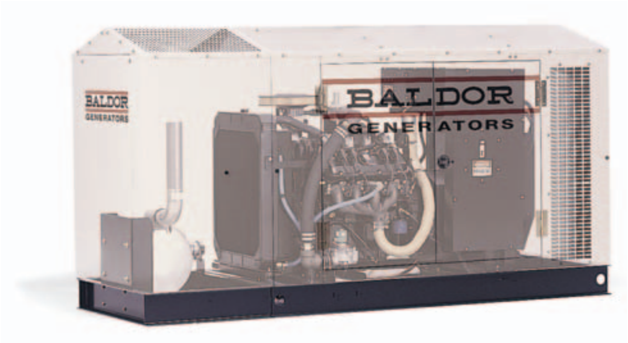

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